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FLIGHT
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FIRST AERONAUTICAL WEEKLY IN THE WORLD: FOUNDED 1909

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Tempering the Wind

THIS particular winter of our discontent has been made, if not a glorious summer, then at least a shiver less discontented—by the S.B.A.C.'s glowing little bulletin announcing that British aircraft exports have more than doubled in three years. The comforting details are recorded on page 148; and most warming of all, to our mind, is the weekly average of three million pounds maintained since the war. (Set beside this, the disclosure that the 1958 figure of over £154 million represented a mere 11 per cent of the United Kingdom's engineering exports strikes a little on the chilly side, excellent though it is in fact.)

We should not be human if we did not warm our toes before such radiant news, though grandma always said that this could cause chilblains. The risk can be avoided if we heed the director of the S.B.A.C., Mr. E. C. Bowyer, for although he speaks of unknowns his words are no old wives' tale. So many are the unknowns that he declares that "it would be a rash man indeed who attempted to look even as far as two years ahead." In the short term, however, he foresees a decline in aggregate turnover which must be reflected in a further diminution of the labour force employed.

All of which makes the plainest of sense. But when future winters come round we must not be looking to the Government alone as our protector against wolves at the door. We have built our industrial house on enterprises as well as upon supports; and while Mr. Bowyer's declaration that he would like to see every Service requirement studied with an emphasis on export possibilities accords perfectly with *Flight's* own views, so, equally, does the contention of the Parliamentary Secretary to the Ministry of Supply that "in the long term, the best hope of success lies in the civil field." Already, as was implied on this page last week, the military side of the business seems to be mating quite happily with the civil, or distaff side (especially so within the Hawker Siddeley family). But the real money-spinning will be done by an entirely new line of civil aircraft of which the ducted-fan short-range airliner might be among the first.

The winters grow no less severe; but the industry is not yet so shorn that it cannot itself do something to temper the wind.

Tea and Sympathy

IT must have been quite a sight for the House of Lords to watch a Marshal of the R.A.F. doing verbal battle against the Air Council, with the Air Minister sitting on the steps of the Throne to listen to him. Obviously Lord Tedder feels very deeply about the Malcolm Clubs; his sincerity has evoked wide support, and the Air Minister has done wisely to grant them a twelve months' reprieve. Welfare in the widest sense is as important an item of R.A.F. equipment as aircraft. It is not only a matter of the morale-boosting cup of tea when working in a cold hangar; what matters more is for the individual airman to feel that someone is taking a personal interest in him. This intangible service is something the Malcolm Clubs seem to provide far more effectively than the more institution-like Naafi, and for that reason alone they deserve a permanent place in R.A.F. welfare. If the Air Council's objection to the clubs is purely financial, should it not count any subsidy well spent that brings its return in high morale?

FROM ALL QUARTERS

Best-ever Year

A RECORD figure of £154,100,962 was achieved by the aircraft industry's exports for 1958. This exceeded the previous year's total (£116,471,110) by 33 per cent and brought the value of aviation sales overseas since the war to £787,019,166, representing a monthly average of £13m and a weekly one of £3m. The 1958 figure accounts for some 11 per cent of the U.K.'s engineering exports; and since 1955, when a record annual total of £66.2m was achieved, the industry has increased the value of its overseas sales by some 133 per cent.

Totals both for aircraft and parts and for aero-engines showed big gains last year over previous record figures. The former, at £98,539,800, increased by 37 per cent compared with the 1956 record (£71,769,410); and the engine total, £49,557,723, showed a gain of 22 per cent over the previous best (£40,642,162 in 1957).

The exports figure for December last year, £12,175,408, owed much to the sales of engines. These totalled £4,119,844, while those for aircraft and parts were £7,558,396, for instruments £219,568, electrical equipment £211,078 and tyres £66,522. During the last month of 1958 the best customer was India (£1,624,871), followed by South Africa (£824,444) and West Germany (£780,954).

India was also the leading buyer of aircraft and parts during 1958 as a whole, spending £18,403,670 and followed by Canada (£14,120,206) and the United States (£12,866,611). The breakdown of the year's total sales is as follows: aircraft and parts £98,539,800 (compared with £69,767,417 in 1957); engines £49,557,723 (£40,642,162); electrical equipment £3,296,857 (£3,267,975); instruments £2,081,925 (£1,979,216); and tyres £624,657 (£814,340).

Argosy Prospects

AN initial Government order for "between 20 and 30" Armstrong Whitworth AW.660s—military version of the Argosy—was announced by the Minister of Supply, Mr. Aubrey Jones, in the House of Commons last Monday. This order is to be placed during the next three months and delivery should begin in 1960.

Meanwhile, interest has been expressed in the civil Argosy by a leading American freight carrier, Riddle Airlines of Miami, who wish to see the aircraft extensively demonstrated on their routes in the U.S. and Caribbean. Preliminary talks have been held on operating costs and performance problems, and it is expected that A.W.A. representatives will go to the U.S. next month for further discussions. It is reported that Riddle may ultimately buy up to 12 Argosies.

Staying Out of the Space Race

REPLYING to questions by Mr. Roy Mason (Lab., Barnsley) in the House of Commons last Friday, the Minister of Supply, Mr. Aubrey Jones, said that no decision had yet been taken to embark on a British programme of space research by satellites. The cost of developing "an earth-space satellite" from Blue Streak or Black Knight missiles would "depend on the details of whatever programme might be undertaken."

In recent weeks it has been stated or implied on several occasions that the Royal Society has recommended the introduction of a space-research programme by the British Government. This was denied by the Society on Monday last. The Society had provided information on the scientific objectives which could be achieved if such a programme were instituted, a Society spokesman said, but it was obviously not in a position to assess costs and other considerations nor to advise the Government as to the overall merits and demerits of such a proposal.

Paris Show Participants

TWELVE countries, in addition to France, will be represented at this year's 23rd International Air Meeting at Le Bourget from June 12 to 21; and to date, 230 exhibitors have confirmed their registrations for the event, which marks the Paris Show's fiftieth anniversary. The foreign countries exhibiting are Austria, Belgium, Canada, Czechoslovakia, Germany, Great Britain, Holland, Italy, Spain, Sweden, Switzerland and the U.S.A.

American exhibitors have requested that a special water tank be constructed for amphibious helicopter demonstrations, and this will cover an area of 1,937 sq ft. There will also be an additional 32,290 sq ft of roofed-in enclosure, an increase of 30 per cent over that provided in 1957.

Ballistic Missiles in Bulgaria?

ACCORDING to the Athens representative of the *Sunday Times*, "Greek army intelligence has information that Bulgaria now possesses Soviet-built guided missiles with a range of 2,500 miles. Well-equipped launching bases have been set up. . . . One is in the Vitosha mountains near Sofia." The report went on to describe launching sites in Albania, and stated that Greek military leaders "concerned by these reports" are trying to speed up arrangements to set up launching sites for Nike anti-aircraft missiles and Honest John artillery batteries.

—And in Pakistan?

UNDER the headline "I Find a Hidden Rocket Base," the London *Daily Mail* for January 23 described how the U.S. Air Force are building "a big Atlas intercontinental ballistic-missile base high in the mountains of Pakistan's wild north-west frontier province." On the same day the Pakistan Minister of Defence and the American ambassador in Karachi both denied the story; the American Embassy said that a jet runway was under construction and the Pakistan Defence Minister stated that American engineers were engaged in building a radar station in the north-west frontier region. (Such a station would, no doubt, be for the purpose of detecting Russian missile tests.)

Napier Board Appointments

FOUR directorships on the Board of D. Napier & Son Ltd. were announced last Monday. They are those of Viscount Caldecote, Sir John Paget, Mr. A. J. Penn and Sir Archibald Hope.

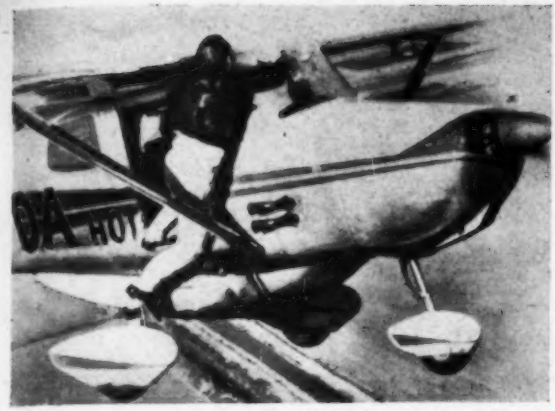
Viscount Caldecote, D.S.C., A.M.I.Mech.E., A.M.I.E.E., A.F.R.Ae.S., is the director responsible for the aeronautical activities of the English Electric Group, of which Napier is a member-company. He was educated at Eton and King's College, Cambridge, where he obtained a first in the Mechanical Science Tripos, and subsequently served in the Royal Navy during the war.

Sir John Paget, M.I.Mech.E., M.I.P.E. (who is also appointed Napier general manager) was at Oundle and at Trinity, where he was a founder of the Cambridge University Gliding Club. Joining as a graduate apprentice in 1936, he was made manager of the London group of Napier factories in 1945 and was promoted to general manager of that group in 1953.

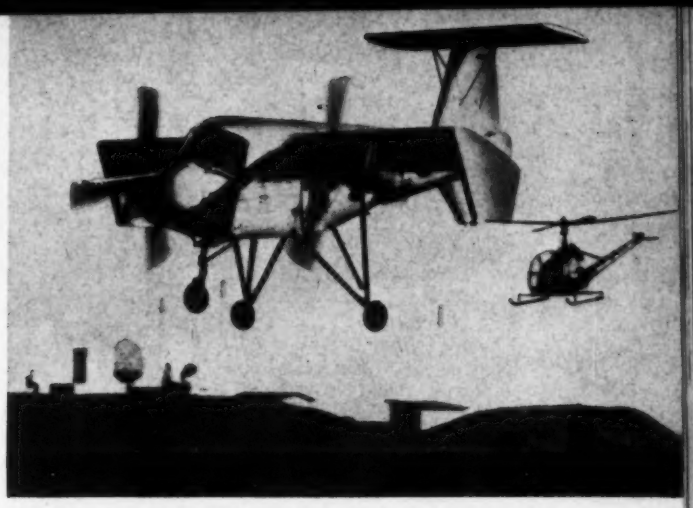
Mr. A. J. Penn, O.B.E., M.I.Mech.E., F.R.Ae.S. (who is also appointed technical director) joined Napier in 1928 and specialized in superchargers. After the war he designed the range of turbo-blowers for diesel engines which the company market, and has in recent years been responsible for the Eland, Oryx and Gazelle. For the past eight years he has been chief engineer of the Aero Gas Turbine Division.

Sir Archibald Hope, O.B.E., D.F.C., A.C.A., who is already a director of the company, becomes director of sales (air). Educated at Eton and Balliol, he learned to fly in the O.U.A.S. in 1930 and fought in the Battle of Britain as C.O. of No. 601 Sqn. After the war he joined Airwork Ltd. and was elected to their Board in 1951. In 1956 he resigned and joined the Napier Board.

THE THREE GRACES: Newly-arrived on the apron at Wisley is the Vickers Vanguard (four Rolls-Royce Tyne) which made its second flight—of 1 hr 50 min—on January 23 and its third flight on the following day. The Vanguard is seen in company with a Valiant (four Rolls-Royce Avon) and one of the last of Continental's fifteen Viscount 812s (four Rolls-Royce Dart). First-flight pictures are on page 150



WINDSCREEN WIPER: Co-pilot John Cook cleans the windscreen of a Cessna 172 as, with Robert Timm, the aircraft was engaged in breaking the world's endurance record by remaining airborne for more than 50 days. The two men hope to stay aloft, around Las Vegas, for 60 days



DEFLECTED SLIPSTREAM: The Ryan Vertiplane VTO research aircraft in company with a Hiller helicopter during its first "conventional" test flight at Moffatt Field, California, recently. The Vertiplane utilizes the deflected slipstream principle and is being developed for the U.S. Army

Anglo-American Swallow?

IN a written reply in the House of Commons last week, Mr. Aubrey Jones, Minister of Supply, stated that negotiations with Vickers-Armstrongs (Aircraft) and the United States Government were expected soon to lead to "a joint research programme on the Swallow project principle" involving some Government finance.

The Swallow project concerns polymorphic (variable-shape) aircraft, with wings which can be swept back at a very acute angle for cruising flight at high supersonic speed yet brought forward again to provide a high lift coefficient for landing. For more than five years such designs have been investigated by Dr. Barnes Wallis, chief of aeronautical research and development of Vickers-Armstrongs at Weybridge. Some £1.5m of public money was spent on it during 1956-7, but Ministry of Supply support was withdrawn in May last year when it was stated that no "immediate military application" could be foreseen. It now appears likely that, notwithstanding opposition in Washington to further mutual assistance programmes, a joint Anglo-American research effort may be initiated, with financial backing from both governments. Mr. Jones added that "it is too early to predict the kind of aircraft which might be able to make use of the Swallow principle."

IN BRIEF

Twelve Fokker Friendships, to be delivered during 1960, have been ordered by the Royal Netherlands Air Force at a total cost of over Fls. 30m (about £3m). Nine are to be equipped as troop transports.

* * *

All four engines of the S.A.S. DC-7C in which Mr. Mikoyan was flying from New York to Copenhagen are being returned to Sweden for examination. After failure of the supercharger in the starboard outer the pilot received a fire warning on the port outer and made an emergency landing at Argentia, Newfoundland. The engines are Wright Turbo-Compounds.

* * *

Development of a new liquid-fuel rocket engine and control system "with the flexibility and control needed for manned interplanetary flights and landings on the Moon" was announced by the U.S. Navy last week. A 10,000 lb-thrust version of the engine has been ground-tested at the U.S. Naval Ordnance Test Station, China Lake, California, and the control system is reported to be capable of controlling a rocket of up to one million pounds thrust.

* * *

The 5 lb atomic generator recently demonstrated at the White House in Washington is expected to have an immediate application as a power source for equipment carried by artificial Earth satellites. Known formally as a radio-isotope fuelled thermo-electric generator, the device was said to represent a "significant breakthrough" in producing electric power from heat.

* * *

An official history of the Air League of the British Empire is being prepared, for publication early in April, to commemorate the League's golden jubilee. Anyone who has any relevant material which might be included—documents, anecdotes, photographs, etc.—is asked to communicate with Mr. Gavin Cochrane, c/o the Secretary-General, Air League of the British Empire, 19 Park Lane, London, W.1.

* * *

Aircraft in Agriculture is the subject of a paper to be presented at next month's National Power Farming Conference by Mr. R. C. Amsden of the Fison organization's research station at Chesterford Park, Essex. The conference, organized by *Flight's* associated journals *Practical Power Farming* and *Farmer and Stockbreeder*, will take place at Harrogate on February 10, 11 and 12.

* * *

A memorial service for the late Louis Massey Hilton, D.F.C., A.F.C., A.F.R.Ae.S., is to be held today (Friday, January 30) at St. Clement Danes, Strand, London, W.C.2.

* * *

The veteran Swedish pilot Goesta Andree, who in 1929 made a solo flight from Stockholm to Cape Town and back, was killed last week in an accident to a Meteor in which he was flying.

* * *

Mr. J. B. Waite has been appointed industrial sales manager of de Havilland Propellers Ltd. with responsibility to the sales director, Mr. C. R. Burgess. Mr. Waite, who for six years had been aero sales manager to D. Napier & Son, joined de Havilland Propellers in December 1957 as technical sales liaison officer, guided weapons.

* * *

In what was described as "the longest non-stop flight within the continental United States," a U.S.A.F. Thunderchief piloted by Capt. Billy White flew last week from Eielson A.F.B., Alaska, to overhead Eglin A.F.B., Florida—a distance of 3,850 miles—in 5 hr 27 min at an average speed of 700 m.p.h.

* * *

It was announced by Pratt & Whitney Aircraft on January 25 that the JT-12 turbojet has been selected to power the four-engined version of the Lockheed Jetstar. Lockheed are in production with airframes at Marietta, Georgia, for JT-12 deliveries in October 1960. Jetstars are already flying with twin Wright TJ-37 (Bristol Orpheus) engines.

* * *

Saab are to begin licence-production of the Alouette helicopter in the spring, with the first aircraft due for completion in July. The initial batch of 15 will be assembled mainly from French components. The first two of eight Alouettes ordered for the Royal Swedish Navy were handed over shortly before Christmas; the Royal Swedish Air Force has so far ordered two.

NAPIER BOARD appointments detailed opposite are those of (left to right) Viscount Caldecote, Sir John Paget, Mr. A. J. Penn and Sir Archibald Hope

"Flight" photograph

VANGUARD MAIDEN FLIGHT

THE three photographs on this page were secured on the gusty afternoon of January 20, when—as we briefly recorded last week—the first Vickers-Armstrongs Vanguard to leave the production line at Weybridge was taken into the air for the first time. The aircraft, registered G-AOYW, had originally been rolled out on December 4, but, after a short period of ground-running, the four Tyne turboprops were returned to the Rolls-Royce factory at Derby for minor alterations.

Only two men were aboard on the first flight; they were G. R. "Jock" Bryce, Vickers chief test pilot, and his deputy, E. B. Trubshaw. The big Vanguard was positioned on the short runway at Weybridge at 3.54 p.m. and, assisted by a stiff southerly breeze, lifted off after ploughing through puddles for about 1,500ft, at a weight of some 95,000 lb. It had originally been intended merely to ferry the aircraft across to the company's main airfield at Wisley, a scant three miles distant, but the pilots found the handling so much to their liking that an on-the-spot decision was made to prolong the flight. G-AOYW was brought back at about 1,000ft directly over the Weybridge works—most of whose occupants were enthusiastically watching—and was then retained in loose formation with the company's Dove, from which the photograph below was obtained. Finally, a fairly low pass was made along the Weybridge runway, before the approach to Wisley was started just as the light began to fade.

In spite of the cross-wind, the touch-down was perfect; and, as soon as the Vanguard was squarely down, beta-control was selected on the D.H. propellers and full reverse-pitch employed. After coming to rest, the aircraft was taxied backwards for a short distance before going on again and parking on the ramp, in front of an assembly of Vickers and airline engineers. First man on board was naturally Sir George Edwards, managing director of Vickers-Armstrongs (Aircraft), who shortly afterwards announced his imminent departure for North America as head of a Vanguard sales team.

On this first occasion the Vanguard was not flown higher than 1,500ft nor faster than about 150 kt, and the undercarriage remained extended throughout the flight. Nevertheless, in the course of 18 min in the air it was possible to ascertain that the general handling was perfectly satisfactory, and "Jock" Bryce himself described the machine as "quite sprightly." Now that the aircraft is at Wisley it will be possible to start serious test-flying with a full crew of flight observers.

On its first flight the Vanguard was flown by G. R. Bryce and E. B. Trubshaw (left and right below), respectively chief test pilot and deputy chief test pilot of Vickers-Armstrongs (Aircraft). The air-to-air shot on the left emphasizes the dank and dismal weather in which the flight was made

"Flight" photograph

This photograph shows an early experimental Brantly B-2. It can be distinguished from the production machines—over a dozen of which are now flying—chiefly by the oil-cooler surrounding the tail boom

BRITISH-BUILT BRANTLYS?

FOR some years the Brantly B-2, a small two-seat helicopter designed and developed by the Brantly Helicopter Corporation of Philadelphia, has remained a rather obscure project, accorded brief treatment in our successive special helicopter issues, and regarded as of no particular significance to this country. Now, however, Mr. N. O. Brantly—to whom the helicopter was originally only a hobby, financed from his other substantial interests—is able to promote the B-2 as a design of singular attractions. It is planned to market it, and later to manufacture it, in this country (and in Australia—*Flight*, November 21, 1958).

As the photograph shows, the B-2 has side-by-side seats for two. Power is provided by a Lycoming VO-360 A1A rated at 180 h.p. on 91-octane fuel. The engine is mounted with the crankshaft vertical and has exhaust-induced cooling. A novel design of three-blade rotor has been evolved, with a diameter of only 23ft 8.9in. The blades are of all-metal construction, with a solid extruded aluminium-alloy leading edge and combined flapping and drag hinges near mid-span. Empty weight with radio is only 960 lb and the structural gross weight is 1,600. With over three hours' supply of fuel, cruising at 100 m.p.h., the residual payload is 460 lb, so that, even with two adults and 50 lb of baggage, lifting power remains for external loads or special gear. An overload of an additional 200 lb can be handled under emergency conditions.

Particularly commendable features of the B-2 are the extremely close attention paid to the attainment of a guaranteed fatigue life of 2,000 hr for the most fatigue-prone components (and an indefinite life elsewhere), the emphasis placed upon minimizing operating costs and the fact that the selling price from the factory at Frederick, Oklahoma, is only $19,950, or a little over £7,000. Brantly Helicopters Ltd. (managing director R. F. Daniel) was formed last autumn, with a registered office at 131 Ystrad Road, Fforestfach, Swansea, Glam. Two demonstration aircraft are expected here early in the spring of this year.

COL. HARRY DELACOMBE

WE regret to record that Lt-Col. Harry Delacombe, O.B.E., A.R.Ae.S., who was one of the earliest air correspondents and had until recently been on the Board of Jablo Propellers Ltd., died on January 10 at the age of 86. (Our recent announcement of his retirement, owing to ill-health, from the Board of Jablo Plastics Industries had gone to press before news of his death was received.)

Col. Delacombe was aeronautical correspondent of *The Times* from 1907 to 1910 and author of *The Boys' Book of Airships and Other Aerial Craft* (1910), and in 1908 became one of the founder-members of the Royal Aero Club. In 1911 he was adviser to the Bristol Aeroplane Co. Ltd., subsequently (1912-14) holding a similar position with Armstrong Whitworth. At the outbreak of the First World War he joined the R.N.A.S., becoming Commandant of the Kite Balloon Headquarters (1915-18); then when the R.A.F. was formed he became Assistant Director of Air Organization at Air Ministry, being appointed O.B.E. for his services. He was made a director of Jablo Propellers in 1937 and became chairman in 1945. From 1939 to 1945 he was chairman of the Air League of the British Empire.

FIAT G.91R AND N

FLIGHT testing of reconnaissance and navigation versions of the Fiat G.91 light fighter are now under way. The reconnaissance G.91R version is a standard machine with full armament, but carries a battery of three cameras in a modified nose.

The G.91N is a modified pre-production aircraft intended for the evaluation of various navigation systems for the low-level tactical rôle. It carries both point-source aids and Decca Navigator and has recently spent some weeks in Britain for Decca tests. It is significant that Decca should be tested as a navigational aid for a high-speed low-level aircraft. The visit of another G.91 to the Bristol factory at Filton is depicted below.

POLISH AMBULANCE SERVICE

STATISTICS published recently in Poland show how rapidly the "flying doctor service" there has developed since its inauguration three years ago. Already 11,000 patients have been carried on 23,000 flights, and the thirty-seven aircraft employed—all of them single-engine fixed-wing types except for one SM-1 helicopter—have flown 27,000 hr and covered 4m km. This year new aircraft are being introduced, including eight helicopters, which are to be used in the mountainous southern part of Poland and along the Baltic coast for mercy flights to ships at sea.

The service, which is officially known as the Air Ambulance Service, is organized on a permanent basis with State-employed air and ground crews. Each province (equivalent to an English county) has its own air ambulance station with crews permanently at standby. The pilots are highly experienced and prepared to land in any sort of terrain; a large percentage of landings take place at night in farm fields illuminated by bonfires.

Because Polish hospitals are few and far between, the ability of the Air Ambulance Service to get urgent medical cases to them quickly is greatly appreciated.

A Fiat G.91 came from Turin to Filton for a series of engine-handling trials last week and is seen here soon after arrival. It was flown via Brétigny by Bristol test pilot Mike Webber. The visit of the Fiat G.91N to another airfield in Britain is recorded on this page

HAWKER SIDDELEY DIRECTORSHIPS

Left to right: Mr. J. A. R. Kay, Sir Roy Dobson and Mr. J. T. Lidbury

MEMBERSHIP of the Board of Hawker Siddeley Aviation Ltd., the new subsidiary company in which the corporate structure of the recently formed Hawker Siddeley Aviation Division is vested, was announced this week. Sir Roy Dobson is chairman and Mr. Hugh Burroughes deputy chairman; the joint managing directors are Mr. J. A. R. Kay and Mr. J. T. Lidbury; and the directors Mr. J. F. Robertson, Mr. S. D. Davis, Sir William Farren, Sir Sydney Camm and Mr. H. M. Woodhams. The secretary is Mr. T. E. Haynes.

Sir Roy Dobson has been managing director of A. V. Roe and Co. Ltd. since 1941 and is also chairman of A. V. Roe (Canada) Ltd. and managing director of the Hawker Siddeley Group. Mr. Burroughes is deputy managing director of the Hawker Siddeley Group and is also on the Boards of the Gloster Aircraft Co. Ltd., Armstrong Siddeley Motors Ltd. and H. M. Hobson Ltd., among other companies. He was president of the S.B.A.C. from 1952 to 1954 and is chairman of the Aircraft Research Association Ltd.

Mr. Kay, who is 44 and a former Armstrong Whitworth and Avro apprentice, has been director and general manager of A. V. Roe and Co. Ltd. since 1950. After serving his apprenticeship he remained with A. V. Roe in various appointments before leaving to become managing director of Northern Aircraft and Engineering Products Ltd., but in 1941 he returned to Avro as general superintendent, responsible for co-ordinating subsidiary firms and sub-contractors engaged on Lancaster production. He was made executive assistant to Sir Roy Dobson in 1947 and became a director in 1950.

Mr. J. T. Lidbury joined the secretarial staff of Hawker Aircraft Ltd. in 1940, after twelve years with an insurance group in London, and in the following year was made assistant secretary. He is 46. In 1948 he became secretary of both Hawker Aircraft Ltd. and its subsidiary company, Hawker Sanders Ltd., and subsequently of Hawker Aircraft (Blackpool) Ltd. on its formation in 1951. He was appointed to the Boards of Hawker Aircraft Ltd. and Hawker Aircraft (Blackpool) Ltd. in that year and in 1953 became general manager of Hawker Aircraft Ltd., assuming a similar post with the Blackpool company in 1956. Commenting on the new organization, Sir Roy Dobson said: "The Hawker Siddelev Aviation Division is now one single integrated unit combining research, design, development and production in the largest organization of its kind in this country and, indeed, in the Commonwealth. Our new executive team has a big job ahead. I think it is very encouraging to see our young executives taking the lead."

FRANK HILLIER

WE record with regret the death last Sunday of Frank Norton Hillier, formerly secretary-general of the Air League of the British Empire and editor of *Air Pictorial*. He had been very ill for over a year and last August it was announced that his successor in the Air League would be A. Cdre. G. J. C. Paul. A. Cdre. Paul took up his post last October.

Frank Hillier was born in 1894 and had a busy and varied career in journalism before becoming foreign editor of the *Daily Mail* in 1935. In 1938 he was appointed press and publicity officer of the Ministry of Home Security, and during the period 1941-48 was publicity controller at B.O.A.C. For a year thereafter he was with British South American Airways, and he joined the Air League in 1950.

BALLISTIC RESULTS

ON January 25 the U.S. Defense Department stated that the United States had at that time launched 65 ballistic missiles. The list was broken down as follows: Convair SM-65 Atlas ICBM, 18 fired, 4 failures, 3 partially successful and 11 successful (two of which went the full range, one becoming an earth satellite); Douglas SM-75 Thor IRBM, 30 fired, 7 failures, 7 partially successful, 16 successful; Chrysler SM-78 Jupiter IRBM, 13 fired, 1 failure, 4 partially successful, 8 successful; Lockheed Polaris submarine-launched IRBM, 4 fired, 1 failure, 3 partially successful. It was emphasized that launchings rated as successful did not necessarily take place at the scheduled time nor achieve the programmed range.

Commemorating the R.34's first East to West and first double crossing of the Atlantic by air, this memorial was unveiled by A.V.-M. J. G. Elton, Chief of Staff to the Chairman, British Joint Services Mission, at Roosevelt Field, Long Island, U.S.A., last month. The Memorial (a bronze plaque on a marble plinth) was donated by the Air League of the British Empire and the site (where the Airship moored) by the American Bosch Arma Corporation

ADROITE ALOUETTE

OPERATING from the fantail of the U.S. Navy destroyer *Everett F. Larson*, a Sud-Aviation Alouette II recently demonstrated its anti-submarine capabilities in the Pacific to senior U.S. Navy officers. The helicopter carried dummy torpedoes and its take-off in less than a minute after sonar contact, and without previous warming-up, impressed observers. It was found that the destroyer's fantail (40ft by 28ft) served "more than adequately" for take-off and landing, and another feature of the tests was that the Alouette used standard diesel fuel drawn from the *Larson's* tanks.

The Alouette II, for which Republic Aviation Corporation holds a U.S. manufacturing licence, is the only jet-powered helicopter certified by the U.S. Civil Aeronautics Administration.

BENDIX IN PARIS

WHAT is claimed to be "the largest symposium and exhibition ever held by a private company in Europe" will be that sponsored by the Bendix Aviation Corporation at the Hotel George V in Paris from February 9-11. Intended principally for leaders of the French aircraft industry, the exhibit will be supported by demonstrations and numerous papers read on such subjects as communications, hydraulics, selective calling and data-link systems, liquid oxygen systems, survival kits, aircraft starting and air-turbine drives. Invitations to participate are being extended to Bendix customers, foreign affiliates, distributors and representatives in Western Europe. Enquiries may be addressed to Bendix Service Exportation, 144 Avenue des Champs Elysées, Paris 8.

Old Warden Airfield, the museum site suggested by A. Cdre. Wheeler. It lies in pleasant country not far from Biggleswade, Bedfordshire

An Aviation Museum —Now or Never?

By A. Cdre. A. H. WHEELER, C.B.E.

A CONSTRUCTIVE plan for an interim approach towards the establishment of a National Aviation Museum is outlined in this article. The author, who is a trustee of the R. O. Shuttleworth (Aviation) Trust, suggests that Old Warden Aerodrome, home of the Shuttleworth Collection, could become the nucleus of a national aircraft museum at the comparatively modest cost of only £10,000

QUITE a time before anyone we know was there to watch it, while the Earth was still cooling down from the hot state, it started forming a museum. The collection it achieved has been of interest to the more intelligent members of the human race ever since they came down from their trees.

Some of the exhibits have been surprisingly well preserved; others, probably owing to their environment, have been less fortunate. The fact that the oldest and most interesting of them have survived till our time is the result, essentially, of two circumstances. The first concerns the composition of the object in relation to its surroundings. The second, and perhaps the more important, is related to the vast numbers which were originally put away. According to the laws of probability, if a few hundred million items are scattered around in reasonably suitable conditions it becomes a near-certainty that a few of them will survive through the ages.

Although we now hope that it may one day be possible to form a national museum devoted exclusively to aviation we may as well learn a lesson from Nature and start off by putting away all the things which seem worth preserving. They should be provided with reasonably suitable accommodation. This is the expensive part of the plan. Securing the actual items should cost little or nothing, for when a thing is obsolescent enough to be considered for a museum it is also obsolescent enough commercially to be considered for scrap. Scrap is proverbially inexpensive (except when you want to buy it) and even in these days it should be possible to delay throwing a few bits of antiquated machinery on to the heap whilst we consider whether they have any historically educational value. The cost of keeping them is solely, as stated above, the cost of their accommodation.

If we delay much longer the formation of an aviation museum, even in embryo, many of the items we would have liked to see in it will have reverted to their original oxidised composition to such an extent that they will be worth nothing at all; the rest of them will have achieved a form of rebirth through the medium of the blast furnace and rolling mills which, though useful commercially, tends to deprive things of any historical value.

Most of us want to see a perfect museum building housing a supremely wise selection of beautifully preserved aeronautical items of very great interest. It is, however, a true saying that perfection is the enemy of production. If we wait until the perfect museum has been designed—and paid for by someone else—and until the final perfect list of items to go in it has been agreed, then we shall never have a museum at all; and never know what would have gone in it if we *had* had one.

There is, of course, the magnificently laid out aeronautical section of the Science Museum, South Kensington, with a planned extension into a much larger space. This should be adequate to house the really epoch-making designs in aviation history up to the present time, although there are still other items which could well be included if more space were available. To supplement this a kind of "filter" museum is needed where items would remain in reserve, some because they are of interest only to the present generation, others because only time will decide whether they justify preservation in perpetuity or whether they are just a delayed category of scrap. Such a supplement to the aviation section of the Science Museum would go a long way to satisfying the present need for a national museum of aviation. Although it is called a "filter museum" here it would be much more than that—in effect, a complete museum of aircraft of very great, but possibly transitory, interest.

A museum's economy differs from that of a commercial enterprise only in the fact that it must be subsidised to a certain extent if it is to achieve the educational purpose for which it is intended. If it has to pay its way without support from outside it will usually have to appeal more to the sensational than the intellectual in human nature—which means that its important educational aim is unlikely to be achieved.

But this does not imply that a museum cannot be made interesting and attractive by intelligent arrangement and full descriptions of the various items. There is every reason for "making the wheels go round" in order to attract the attention and stimulate the imagination of the young. This is particularly important in an aviation museum, where an ancient flying machine standing behind ropes indoors looks a most unpromising engineering achievement; but moving across a flying field it can be a most inspiring sight. Many such items may be too precious or too delicate to be flown any more, but a few early types can, on special selected occasions, be displayed to give a useful impression of early flight. This has been the guiding principle of the Shuttleworth Trust Collection ever since it was formed—to display to the public a reasonably comprehensive collection (so far as finance permits) of early aeronautical achievements. Up to the present time the accommodation available has been only sufficient to provide for maintenance and storage—exhibition has needed special arrangements—but plans are now being prepared for extending the accommodation sufficiently to allow the whole collection to be properly displayed for the public to see, particularly at weekends during the summer months.

An estimate suggests that additional accommodation costing about £7,000 would allow all the Trust's existing aeroplanes, engines and other items to be permanently on show and allow extra space for another eight or nine fully rigged aeroplanes of the First World War period, or before, plus other engines and equipment. Roughly speaking, accommodation costs about £1 per square foot for the type of museum buildings intended. These would be small hangar-type structures not unlike those used by the early pioneers and by the flying Services in the First World War. They would all face on to the aerodrome, so that the historic aeroplanes would be seen in an environment typical of the early days. It is possible to get down to this sort of figure for the buildings because the ground they will stand on belongs to the main Trust. The installation of lighting and just sufficient heating to keep the buildings dry would bring the figure slightly higher, but considerable economy can be achieved by the very limited heating to be provided.

Another £3,000 (making £10,000 in all) would, when invested, provide a small income to pay for the weekend services of an aged but knowledgeable pensioner, who would be needed to supervise and show round visitors. In addition, a small charge for adult visitors which would help to defray general maintenance costs.

Other incidental costs can be covered by the existing income of the Shuttleworth Trust Collection, which already maintains the aerodrome and workshop facilities required. If any further money became available it would be spent in extending the accommodation, which will inevitably tend to become too small as time goes on unless a full-scale national museum is provided.

There is, therefore, a possibility of an alternative interim scheme which could be complementary to a national scheme when is got going but which would bridge the present difficult period by housing and displaying a number of the interesting historical aeronautical items that are in existence now but for many of which there is no proper accommodation.

If a national museum should eventually be formed, the maintenance facilities and aerodrome belonging to the Shuttleworth Trust, together with the accommodation there, will be an invaluable asset: it will provide facilities for preparing new exhibits for show and will always have an aerodrome on which small displays can be given for educational purposes and for general interest.

As in all schemes money is the dominant factor. The Shuttleworth Collection, by their own efforts and with generous assistance from a number of broadminded subscribers in the aircraft industry, have managed to keep going and indeed to expand slowly during the last decade; but it is a slow process. Any attempt to expand

AN AVIATION MUSEUM—NOW OR NEVER? . . .

rapidly on the lines indicated would be too risky from the financial point of view unless public support were forthcoming. Although the figure of about £10,000 required for the scheme is large so far as the Shuttleworth Trust is concerned, it is insignificant by comparison with even conservative estimates of the sum required to initiate a comprehensive, suitably located national museum. The doubt to be resolved, therefore, is whether or not those interested in aviation in this country would support a scheme of this nature to bridge over the present difficult period and to provide an opportunity for them to see all, or nearly all, of the oldest historic types of aeroplanes, engines and equipment in an appropriate environment.

If the money required were forthcoming—chiefly from all those people who still take an interest in and believe in aviation—then the donors would have the assurance of the aviation side of the Shuttleworth Trust that the money would be wisely spent by an organization which knows to the last farthing how to make money go far. (In the past this has been so necessary that it has become a habit!) Every £1 subscribed will provide one more square foot of museum space, and an associated eight shillings will endow that particular square foot with a sufficient income to keep it and its contents clean and dry and also to pay an attendant to supervise and enlighten visitors. These calculations are based on a minimum space of 7,000 sq ft, which is the minimum where one could house a collection sufficiently large and diverse (i.e., sufficiently interesting) to attract visitors from London, which is 50 miles distant, or from the Midland industrial areas, the nearest point of which is 60 miles distant.

Only on very special occasions would flying displays be staged. Apart from the aeroplanes there would also be on view an exceptionally interesting collection of historical cars, carriages and the complete range of bicycles from the earliest to the latest, all set in similar surroundings to those in which they might have been seen half a century ago.

The practicability and the value of this scheme has been discussed with the Royal Aeronautical Society, who are entirely sympathetic to the plans of the Shuttleworth Trust. Sir William Farren, as a council-member and past president of the Society, has kindly agreed to act as special adviser to the Trust and to provide the necessary contact with the Society.

ASSINIBOIA REVISITED

By A. M. PENNIE

TO the youth of today the name Assiniboia probably means nothing. Few could place it on the right continent and far fewer could spot it in the correct Province of Canada. Yet fifteen years ago it was a thriving part of Britain, existing as No. 34 B.F.T.S., Royal Air Force, on the prairies of South Saskatchewan. In its 2½ years of operation some 2,500 budding pilots made their homes there and learned the rudiments of flying.

Like most of the flying training stations of the Commonwealth Air Training Plan, it was situated miles from anywhere and seemed as if it had been planted on the bald prairie as a prefabricated unit. And that is literally what did happen; construction crews moved in to the wide, empty spaces practically overnight and rapidly transformed the prairie into the familiar triangular-runwayed airfield with its stereotyped but well-designed living and working quarters. The only inhabitants who suffered as a result of the metamorphosis were the gophers, the prairie chickens, and the coyotes.

Most pupils had but a passing knowledge of Assiniboia and their two months' posting passed perhaps all too quickly. But in that short time they came to look upon the station as their home and, like most early-training stations, it remained as a pleasant landmark in their careers.

To those of us whose lot it was to instruct, Assiniboia meant a great deal more. For the majority it was our first permanent home in the Air Force. Ever since we had joined we had been continually on courses; here, at long last, we escaped from the stigma of being pupils and found somewhere to put away kitbags and hang up clothes in a wardrobe. After barrack-room life, accommodation was princely and we were treated with the respect one always thought a brand new pilot deserved! We had a job of work to do—a challenging job—and working conditions could not have been better. Companionship was ideal and some of our strongest and most lasting friendships were made on the prairies.

The mention of the name Assiniboia brings back a flood of memories and recollections—the beautiful prairie sunrises and sunsets; the early morning and late evening flights in the still, quiet air; the joy of aerobatics in the clear blue prairie sky; the welcome beer on the Mess verandah at the end of a hot summer's day; discussions of the finer points of flying as we watched the last stragglers coming into land at dusk. Later in the evening, the sing-songs in the Mess, the surreptitious raids on the kitchen for potatoes to roast in the open fireplace, and, of course, the feats of strength and acrobatics on the pipes and hot-air ducts suspended from the ceiling. And there were many more—the days off and visits to the town of Assiniboia with its unpaved streets and board-walks; the old El Prado beer parlour; the White Dove Cafe and Billy, its genial and friendly proprietor; and, of course, the many kind and hospitable inhabitants who made their homes ours.

All these and many other memories came to mind as I drove down from Moose Jaw to visit Assiniboia after an absence of 14 years. As the town of Congress was neared excitement increased, yet there was no sign of the airfield. The left turn on to the narrow gravelled road was made; but after a couple of miles still no field appeared. Then a passing farmer reassured me that I was on the right road but added that there was nothing left of the station. I could scarcely believe his words and felt and hoped that he was exaggerating. A mile or so further on the remains of the old familiar wire fence appeared but beyond it there was literally nothing. My heart sank to my boots and I had the strange feeling that something great had gone out of my life forever—something that could never be replaced. All the buildings had disappeared; grass and weeds had taken over and in some places had grown to a height of two or three feet. Caragana, that ubiquitous prairie shrub, had moved in and was now flourishing on roadways, open spaces, and on the remains of building foundations. The scene was one of complete desolation and my feelings were of loneliness, regret and sorrow.

Fireplace of the officers' Mess

I found my way to my old quarters and from there to the Mess, to stand where I had often stood by the fireplace, now overgrown by two or three caragana bushes, then down to the tarmac and the remains of the hangar area. I could pace out where the flight office, instructors' rooms, crew rooms and canteen used to be. I drove down each cracked and weed-grown runway, and without effort turned the clock back 14 years to re-live for a few quiet moments some of the halcyon days of 1942-44. How clearly I recalled the incessant rasping noise of aircraft engines, the sweet yet sickly smell of gasoline, the feeling of satisfaction and achievement on sending a pupil on his first solo flight and exhilaration of flying on a cold, frosty night!

Assiniboia's war-time inhabitants are now scattered throughout the four corners of the world, and the gophers, prairie chickens and coyotes have returned to the habitat from which they were evicted in 1941. In the town it is easier to see that all this was not a dream. The main street is almost unchanged but it is now paved and there are concrete sidewalks. The buildings are little changed in character but the names have altered. Billy has departed and the White Dove is now the City Café. Joe the taximan is much older but still in business; and the El Prado, as a result of modernization, has changed its name to something more plebeian and less romantic and thus has lost a great deal of its colour and atmosphere. Many of our old friends still live in Assiniboia. Their hospitality is as generous and overwhelming as it ever was and their scrapbooks, fascinating in retrospect, are perhaps the only recorded histories of these memorable days. Round the town, scattered here and there, are many of the old buildings salvaged from the airfield, and parts of our old home are still recognizable despite modifications and coats of paint.

It is a pity, one feels, that the R.A.F. did not erect some sort of permanent memorial—at Assiniboia and at other such places—indicating the part they played in the Second World War. Like many of the smaller towns in Canada that nurtured and fostered the Air Training Plan, Assiniboia has its plot of land that will forever be part of Britain. There in that green and hallowed spot, just as we left them, are the 16 graves of those who never left the prairie. Time, Man, and Nature have erased the airfield but these well-tended graves still remain and are the sad but the only tangible evidence that there once was an R.A.F. Station called Assiniboia.

U.S.A.F. in LIBYA

FIVE miles east of the city of Tripoli, on Libya's Mediterranean coastline, lies Wheelus Air Force Base, the largest and perhaps most active of all overseas bases of the U.S. Air Force. Covering an area of several thousand acres on the site of the centuries-old Mellaha salt-flats, the airfield is the home of the Headquarters of the 17th Air Force, constituent units of which are located in Morocco, Italy, Greece, Crete and Turkey.

The primary mission of Wheelus is the support and training of U.S.A.F. European-based fighter-bomber squadrons, and the air defence of the Libyan area. In addition, the size and location of the base makes it an important and busy staging-post in the Military Air Transport Service network. Some 14,000 Air Force personnel and their dependants are stationed at Wheelus, and an average of 11,000 aircraft movements per month was logged during 1958.

Commanded by Maj-Gen. Henry R. Spicer, the 17th Air Force includes among its tasks the operational control of all units in the U.S.A.F.E. southern area; administrative and logistic support for Strategic Air Command, M.A.T.S. and other U.S.A.F. units; technical advice and training facilities for foreign nations; and air defence in co-ordination with NATO, allied and U.S. commanders. The Force was "activated" in April 1953, and its headquarters were at Rabat, French Morocco, until its move to Wheelus in August 1956.

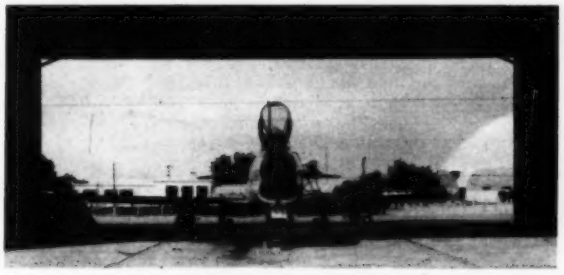
The base unit at Wheelus is the 7272nd Air Base Wing, commanded (as is the station) by Col. Jack W. Saunders. The Wing is divided into three main groups, devoted respectively to air gunnery, operations and support. The total number of Wing units at Wheelus is 14, in addition to 32 lodger units and the rotational squadrons.

The training and evaluation of European-based fighter and attack squadrons of the U.S.A.F. is the task of the 7272nd Aircraft Gunnery Group, to which unit squadrons are periodically attached for gunnery, rocketry and bombing practice. Known familiarly as the U.S.A.F.E. Weapons Center, this Group operates two air-to-air ranges over the Mediterranean between 20 and 30 miles from Tripoli; an air-to-ground range at El Uotia, located in the desert some 75 miles to the west; and another desert range for Matador missile launchings.

For the air-to-air gunnery and rocketry training, radar-reflecting targets are towed by B-57Es (Martin-built Canberras) of the 7235th Support Squadron, and this squadron also operates the F-100 Super Sabres which are used as chase aircraft for the intercepters under training. Should a fighter's radar lock on to the tug and not the target, the order to break off is given over the R/T by the chase pilot.

The operations group in the Wing organization contains a number of constituent units, two of which work in combination to provide effective air defence of the Libyan area. The airborne arm of this dual group is the 431st Fighter Interceptor Squadron, equipped with F-86D all-weather intercepters; while

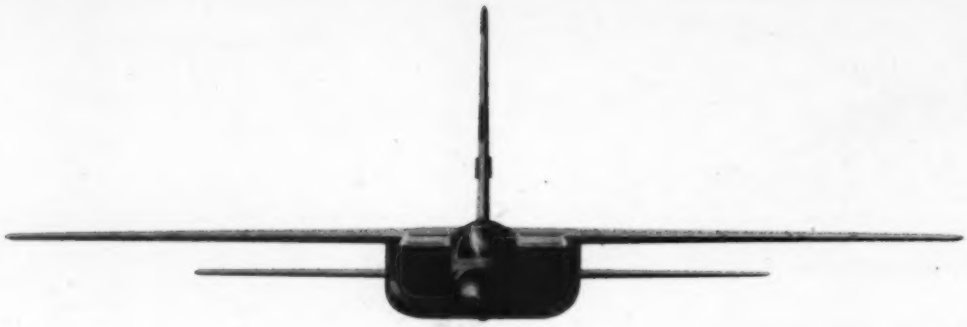
North American F-100C Super Sabres used as chase aircraft by 7235th Support Squadron are seen in the heading picture on the ramp at Wheelus. Above, an F-100F two-seat trainer. Below, an F-86D all-weather intercepter at readiness in one of the alert hangars of 431st Fighter Interceptor Squadron, which provides air defence of Libya



radar watch and direction of the Sabre "Dogs" is the job of the 633rd Aircraft Control and Warning Squadron.

With a search radius extending as far as Benghazi, the 633 radar system plots every aircraft flying in or entering the Libyan defence zone. The information is presented on C.R. screens in the Wheelus Air Defense Direction Center, whose personnel keep in touch with Libyan Air Traffic Control concerning civil and other scheduled aircraft movements. The unit also gives navigational aid to aircraft in distress and assists in air-sea rescue.

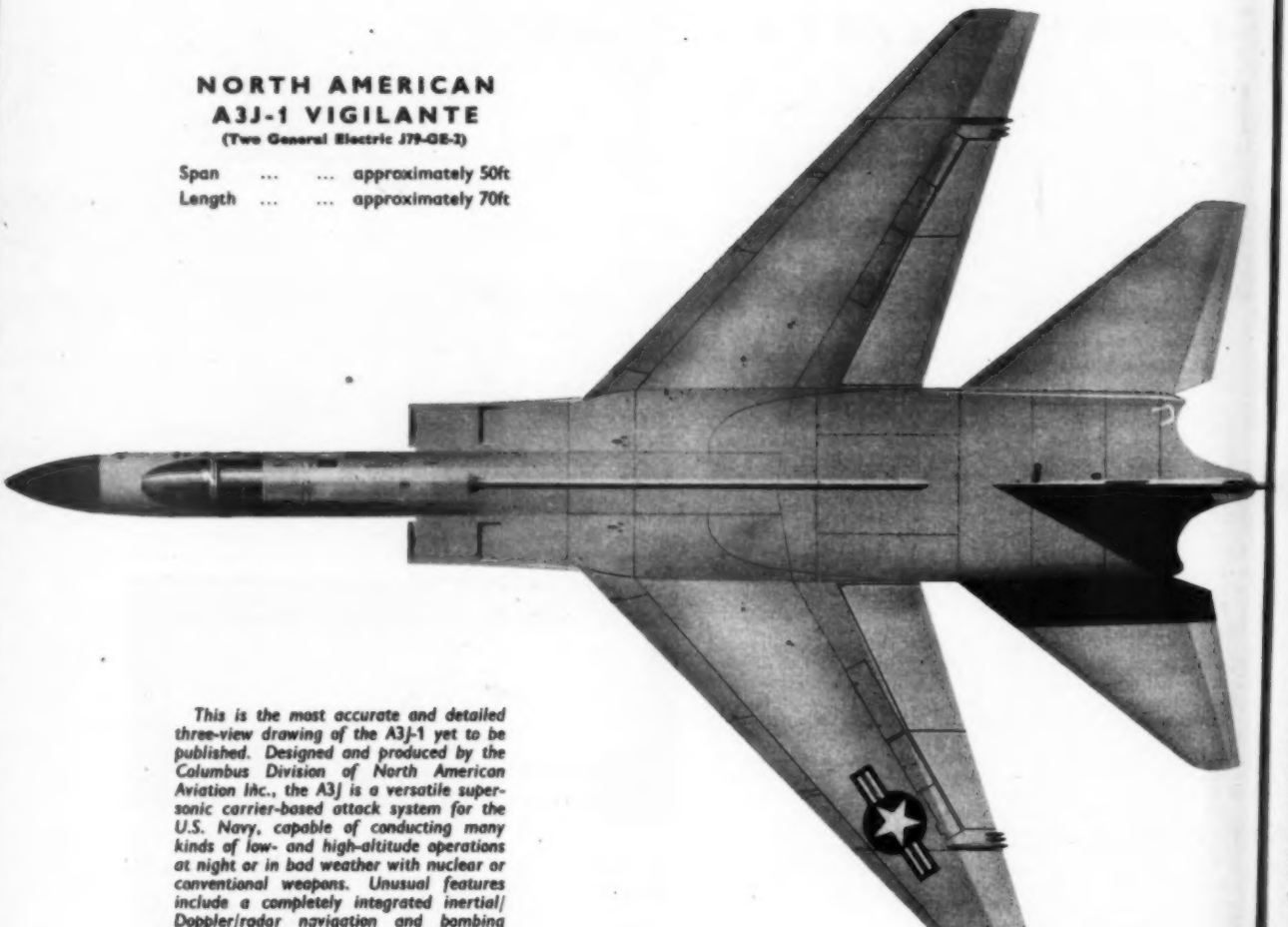
Target-towing for European U.S.A.F. fighter squadrons is performed at Wheelus by Martin B-57Es (note rear target-release tube) of 7235th Support Squadron. Automatic towing reel-out mechanism is located in the bomb-bay, the rotary door of which is here seen removed



NORTH AMERICAN A3J-1 VIGILANTE

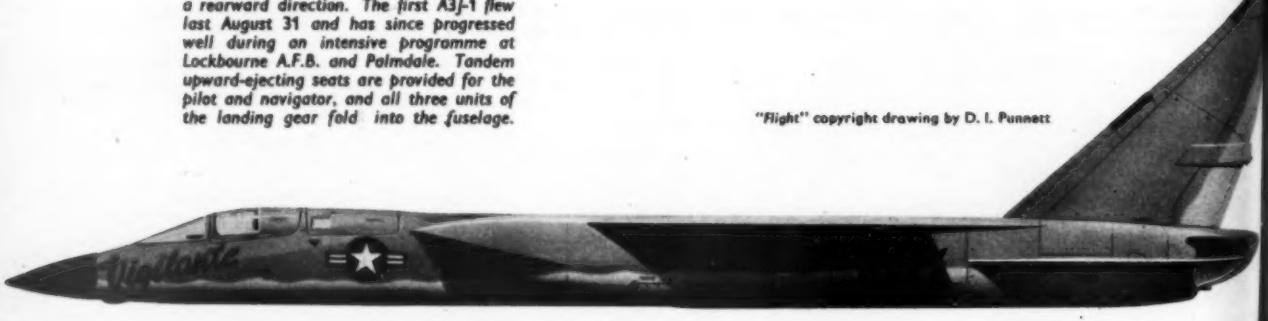
(Two General Electric J79-GE-1)

Span ... ... approximately 50ft
Length ... ... approximately 70ft



This is the most accurate and detailed three-view drawing of the A3J-1 yet to be published. Designed and produced by the Columbus Division of North American Aviation Inc., the A3J is a versatile supersonic carrier-based attack system for the U.S. Navy, capable of conducting many kinds of low- and high-altitude operations at night or in bad weather with nuclear or conventional weapons. Unusual features include a completely integrated inertial/Doppler/radar navigation and bombing system, a drooping leading edge, blown flaps, spoilers for lateral control, slab-type horizontal and vertical tail surfaces, nitrogen-operated accessory services and a "linear bomb bay" in the form of an axial tunnel through which stores are ejected in a rearward direction. The first A3J-1 flew last August 31 and has since progressed well during an intensive programme at Lockbourne A.F.B. and Palmdale. Tandem upward-ejecting seats are provided for the pilot and navigator, and all three units of the landing gear fold into the fuselage.

"Flight" copyright drawing by D. I. Punnett



The Future of British Private Flying

WHICH COURSE TO TAKE?

By DAVID B. BROWN

IN a community that lies beneath a complex pattern of controlled and crowded airspace there are two ways of dealing with the desire to fly light aeroplanes. One is to strangle it without delay and the other is to encourage its development, on a solid foundation of common sense and mutual understanding, towards two main objectives. These are, first, that its supporters should not constitute a menace either to themselves or to others; and second, that the nation as a whole may benefit from the undoubted advantages offered by a widespread enthusiasm for private flying.

For a time it seemed that in this country the former course was being adopted and the outlook for private flying enthusiasts was gloomy indeed. Now, however, a Joint Standing Committee has been appointed to consider the well-being of the movement and there are prospects of new aircraft, new equipment and a centre for private flying; so it appears that the second alternative may be tried.

Many problems remain, nevertheless, and this may be an appropriate time to consider how these can be solved so that the twin objectives of this new policy can be fully achieved. For one point is clear: there is no room for half-measures and continued indecision. This can result not only in the extermination of private flying but also in the very real possibility of serious accidents in the process, because it is not easy to maintain a safe standard of flying where a state of uncertainty and semi-persecution exists.

As a result of the diligent efforts of the various organizations and instructors responsible, the standard of flying at the majority of clubs and groups is high at the moment, despite past uncertainty and bitter disappointments. But there are still a number of black sheep to be eliminated; these are the odd men out who, once having obtained a licence, manage to evade any form of thorough subsequent check and allow their flying standards to suffer progressively until their aerial activities are cut short by court proceedings (or a coroner's inquest), thus getting the whole movement a bad name. Furthermore, maintenance of the generally high instructional standard must be assured despite the fact that the supply of Service-trained instructors will dwindle to a mere trickle. Only when these objectives have been achieved can private flying prove itself worthy of official encouragement.

There is, however, an even greater problem—the general attitude to the private flying movement, the failure to recognize its potentialities and the reluctance to grant it any but the most grudging encouragement. Doubtless this is partially due to the fact that the movement itself seems to be uncertain of what it really does want. One can hardly blame a Ministry already beset by a multitude of headaches (involved in quick changes from lorry driver's cap to pilot's helmet) if it can find scant sympathy for a bunch of enthusiasts who cannot establish a common basis of agreement as to their own requirements. One faction claims that as powered private flying is almost dead we must encourage gliding; another quotes the subsidies bestowed by other countries; while yet another states that financial aid is not required and that, if granted, it is usually wasted. Small wonder that official encouragement is half-hearted and that official reaction to these conflicting demands is a suggestion that private flying must realize it is simply up against the hard facts of life.

Value of the Movement

Let us, therefore, examine this question of the value of the movement before considering the methods by which a safe general standard of flying can be maintained. Once these first principles have been clearly established the remaining problems—new British aircraft and equipment, financial aid and general encouragement—become relative matters of common sense, capable of reasonable discussion by the Joint Standing Committee, rather than hesitant and conflicting pleas for mercy drowned by the hollow laugh of officialdom.

Before the value of the movement can be fairly established one point deserves particular emphasis. This is simply the description of the movement itself. "Private" flying is too inhibited, too likely to give the impression of a handful of well-endowed enthusiasts supplemented by a few half-starved fanatics eager to fly rather than eat. If the movement is to become widespread, and if its supporters are to deserve respect and support, it must be made abundantly clear that this pastime is not private in any restrictive sense, but is a wide-open source of popular enjoyment that can and should be made available to all. We already have Popular Flying Groups which display a keen desire to fly without either considerable means or fanaticism. Surely it is time to christen this whole enterprise—flying clubs, gliding clubs, groups and private owners—the Popular Flying Movement and renounce any hint of privacy except, perhaps, to distinguish the private pilot from his professional counterpart.

Now as to the advantages. To begin with one of the most significant items of all, a healthy popular flying movement would promote a measure of practical airmindedness throughout the community upon a scale hitherto unknown in this country. As a nation we are naturally insular and little-minded as far as overseas travel is concerned. Whereas a journey of 200 miles northward from London is thought of as a simple matter of a few hours by train or car, a southward journey of similar length still raises problems of sea voyages, Customs and currency difficulties, with all the delay and annoyance that these entail. Only now—after the aeroplane has been with us for fifty years—are we as a nation beginning to resort to the air to break down a few of the time-honoured barriers. As a result our knowledge of other countries is still sadly lacking compared with their knowledge of ours. In particular, our efforts in the export field are still hindered by ignorance and subconscious dislike of foreign methods and requirements, while our general attitude towards flying itself is still one of slight wonderment coupled with strict non-participation except, perhaps, as rather apprehensive passengers.

If this seems an exaggeration then a glance at the way in which aeronautical matters are reported in the popular Press should be sufficient to establish that, if anything, it is an understatement. That this should be so of a country that originated the Spitfire and the successful jet engine, that pioneered the first civil jet age and found the courage to herald the second, is surprising to say the least. That it should be so of a community that owes its very existence as a free nation to the outcome of an aerial battle is well-nigh unbelievable.

Towards Wider Horizons

Practical airmindedness means more than a large crowd at Farnborough or a boom in air travel for Continental holidays. It means that a large and ever-growing number of ordinary people must gradually become familiar with aeroplanes and the air in which they fly. They will learn to view more sympathetically the practical problems of aviation that require their co-operation and tolerance, and they will be both capable and willing to guide and encourage their children—the pilots, designers and constructors of tomorrow's aeroplanes—in the ways of the air. And last, but by no means least, they will begin to fly themselves and their families to the Continent and to regard such journeys as of no particular consequence. It is not the length of these trips that matters, nor the destinations: it is the attitude of mind that such flights engender—a breaking-down of barriers and inhibitions, a widening of horizons and a restoration of balance to our lopsided sense of time and distance.

Much has already been said and written about two further advantages: the re-birth of a flourishing light-aircraft industry, producing not only aeroplanes for pleasure flying but also executive-type aircraft to meet the logical increase in business flying, and the provision of better facilities for *ab initio* training of commercial pilots. There are in addition two more benefits which so far do not seem to have attracted their fair share of publicity.

The past year has seen much in the way of heart-searching throughout the aircraft industry, with economy as the goal. Presumably the lists of afterthought modifications to production aircraft came in for their share of close scrutiny. Perhaps it occurred to the financial wizards engaged upon these studies that a number of hasty and expensive grabs for the stable door could have been avoided if only more designers and draughtsmen could call upon the cold logic of practical flying experience.

This point, of course, is relative: a few hours' experience in a light aircraft will not be of much direct help in the design of a supersonic airliner. But even the faintest suggestion of practical experience would go far towards eliminating the tendency to design for ten-handed aircrew, or to dream up hasty modifications that look simply wonderful on paper but just will not work in the air. Surely it is obvious that both time and money would be saved if more of these earthbound experts were encouraged to learn to fly themselves. At the moment by no means all the aircraft manufacturers have their own works flying clubs, and certainly not all the sub-contractors. Even where such clubs do exist and flourish, their members constitute only a fraction of those who would fly—even be shamed into flying—if the nation as a whole were practically airminded.

The second of these two advantages offers no financial reward but a considerable degree of moral significance. We have ample

Tiger Moths and Croydon Airport have each been synonymous with British private flying for many years. The past rather than the future of the movement is perhaps typified in this picture

BRITISH PRIVATE FLYING . . .

proof that our nation's youth is, in general, angry, dispirited and aimless—its members seek a challenge which will help them rise above the cossetted pilgrimage from cradle to grave that constitutes our existence today. The Outward Bound movement provides such a challenge and so do the Air Training Corps and similar bodies; their success is proof of the demand. But this is merely scratching at the surface. The air, with its promise of release from our well-ordered pettiness, offers such a wide scope for inspired challenge to our youth that it must be made accessible to them on a scale far greater than hitherto. It is not only the boys who hope to join the Royal Air Force, or the members of other cadet forces, or even the would-be professional pilots who should be given this opportunity: popular flying must be made easily available to the vast majority of boys and girls who are willing to devote time, energy and a little cash towards this end. In short, an Outward Bound movement with wings is needed to provide our citizens of tomorrow with a few ideals on a somewhat loftier plane than cutting a neat caper on a dance-floor.

These, then, are the advantages. Now let us proceed to the second of these two basic principles—how to maintain a high standard of instructional and general flying and eliminate the black sheep.

A high standard of flying is demanded of any pilot in this country, whether he is flying an airliner or an ultra-light, simply because our airspace *is* crowded, our weather *is* uncertain and, most important of all, because aeroplanes are not like ships or motor cars of which it can fairly be said that in the event of a collision the little man usually fares worst. These are the facts, and no amount of avid enthusiasm for popular flying will alter them. Hence the need for a high standard of flying and discipline whatever the type of aircraft being flown. Mere mention of the word discipline is apt to conjure up fearsome images of regimentation in a movement which should essentially be as free and easy as possible. But discipline in this context means common sense and good airmanship—nothing more, and certainly nothing less.

To instil and maintain good airmanship two factors are essential. The first is sound instruction. The second is the introduction of a check system that will get rid of the loopholes for the odd men out. This point deserves emphasis because mere flying experience without occasional supervision is a poor criterion of a safe flying standard: whereas it should certainly produce an increased degree of dexterity in handling of the aircraft, it is equally likely in some cases to result in a dangerous state of overconfidence, particularly in the early stages of a pilot's flying life, thus sowing seeds which yield a sad harvest in the form of subsequent accidents.

While much has been done to ensure that the standard of flying instruction is kept as high as possible, the present rating system is, in the opinion of the writer, inadequate to ensure the maintenance of such a standard in the future. This system was evolved when many, if not the majority, of instructors who could qualify for full rating were trained in the C.F.S. tradition, and the latest experience of that body is still made available by the periodic checks of civilian instructors engaged upon A.T.C. flying. But conditions are changing. There are many instructors who lack Service training, there will be fewer coming to the clubs from the Services, not all clubs are approved for A.T.C. instruction (however long that form of activity may be allowed to last) and, apart from this provision, there is little to prevent a civil instructor soldiering on indefinitely, once he is fully rated, provided that he does a certain amount of instructional flying each year.

This is as bad for the instructor as the corresponding lack of checks is for the ordinary pilot. Experience is not the sole criterion: instructional technique deteriorates, and new theories and techniques may, or should, be evolved which, even if notified to instructors, may not be adopted because of prejudice or misconception. Flying is, after all, a living art: more is learned each day, not only in the course of normal flying but as the result of accident-analysis. Instructional technique should be capable of swift modification and universal application in consequence.

There is another shortcoming in the present system, and this is the title of "assistant instructor." To the slightly apprehensive *ab initio* pupil the man in the other seat is an instructor. He is not assisting anybody, he is doing the job himself. If, due to lack of instructional experience, his responsibilities must be limited he should be classified accordingly, but not as an "assistant" instructor, which gives the impression that he is sitting-in for a superior being who will pop up from the cockpit floor if the going gets tough.

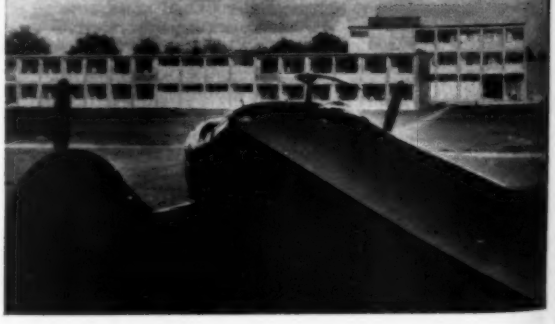
The answer seems to be the introduction of a categorization system for civilian instructors based upon that used in the Service. The newly-fledged instructor would commence with the equivalent of a B2 category with limitations corresponding to those applicable at present to the assistant instructor. This category would be awarded for a limited period during which time the new instructor would have to qualify for re-categorization. From the equivalent of a B1 upwards the incentive for re-categorization would be financial and qualification would be subject to the successful completion of a practical and theoretical test with the proviso that all instructors, whether qualifying for re-categorization or not, must be so tested periodically at least once every two years.

Such a scheme would naturally entail an amount of testing beyond the time available to the existing Panel of Examiners, which raises a point of supreme importance. In the light of changing conditions, surely it is time that this country should have a University of Flying to earn for us a reputation for civil flying instructional standards equivalent to that which has long been established by the Central Flying School for Service flying. The question of *ab initio* instruction for potential professional pilots is of vital and increasing importance. It is at this stage that good or bad habits are formed and first-class example and a standardized, up-to-date instructional technique are essential. The system for providing this instruction must be capable of bearing the heavy weight of such a responsibility: the obvious basis for such a system is a University of Flying.

One of the principal functions of the university would be to provide a nucleus of highly-trained and experienced examining instructors who, because of these qualifications and their liaison with the Royal Air Force, would be up-to-the-minute in the latest instructional techniques and who, by virtue of their authority, would be in a position to ensure that these were adopted.

Granted the establishment of such a full-time examining authority, the maintenance of a high standard of civil flying instruction would be assured. The instructors at clubs and groups would, in turn, be well qualified to give thorough periodic checks to all private pilots. Thus the up-to-the-minute pattern of instruction would be spread and maintained throughout the popular flying movement and the loopholes would be eliminated.

Turning now to the question of equipment, the requirements are simple. However well the private pilot has been taught, he can still be a menace unless he has the means of knowing exactly



The Netherlands national civil aviation school at Eelde, near Groningen (its residential block is here seen from one of the hangars) goes a long way towards the author's idea of a University of Flying

where the controlled airspaces are, so that he can avoid them when necessary. He must know their exact position both in plan and elevation relative to his aeroplane throughout the entire flight, not merely during pre-flight planning on the ground. He must therefore use an up-to-date map with the airways and other controlled areas shown, and a serviceable altimeter which has been correctly set.

Such maps are of course available and are used by the majority of pilots, but it is once more a question of eliminating loopholes whereby a handful of black sheep can continue to use maps of doubtful vintage without the faintest hint of an airway. It is this same dubious breed who fly with altimeters set to zero on the ground because they cannot be bothered with mental arithmetic in the circuit. Today, when some club airfields lie beneath control areas or airways, with precious little clearance between circuit height and the base of the controlled airspace, such a procedure is downright dangerous. The very thought of commercial aircraft using one altimeter setting for a particular area while enthusiastic amateurs fly in the near vicinity, not quite sure if they are in V.M.C. or I.M.C., with altimeters set perhaps to zero before take-off, or to a two-hour-old QNH approximation on an unchecked instrument, is not funny to anyone—least of all to the pilots and passengers in the commercial aircraft, who may suffer drastically in consequence.

There are two answers to this problem. The first is that the use of a suitable map and a correctly set and serviceable altimeter must be made mandatory for all private pilots. In time, compliance with these conditions would be a logical outcome of standardized instruction, but to ensure universal coverage a simple interim procedure would be the preparation of a Popular Flying Code. This would be a Highway Code of the air which could embrace these and other points of basic airmanship which have hitherto been handed down as accepted practice but never presented concisely in print. It would take the form of a booklet to be issued with the private pilot's licence and subsequently amended when necessary. Knowledge of the Code and observation of its rules could be made a condition of licence validity and thus the aim of universal coverage achieved with the least bother.

The second answer lies in the use of radio. Apart from its more obvious advantages, the urgent need for common altimeter settings for all aircraft at any given time in any particular area dictates the requirement for radio to be installed in all aircraft down to the lightest of ultra-lights. This matter is already receiving the attention of the Royal Aero Club so there is no need to enlarge upon it here except to emphasise its necessity.

The question of equipment leads naturally to that of the aircraft in which to instal it. This problem also is already under discussion and further comment is unnecessary except to stress the need for new or cheaper trainers to replace the venerable Tiger Moths. Such machines must have good healthy stalling and spinning characteristics (because an ounce of practical demonstration at a safe height is worth a ton of circulars and sermons when dealing with such matters as stalling off a climbing turn) and must be fully aerobatic because aerobatics are the essence of pure flying. They are essential during the initial training of every pilot if he is to be able to recover from unusual attitudes, whatever the size of the aircraft which he subsequently flies, by nursing his machine back to normal rather than clutching the stick in a cold sweat because he's never seen the horizon at that horrible angle before.

Finally there is the problem of cost: a University of Flying, popular flying for boys and girls, incentive for instructors, radio . . . who is going to pay? In the first place, the idea of a University of Flying has only been touched upon, with its particular application to popular flying. It has, of course, far wider implications. Aircrew training for the sophisticated civil aircraft of today is one of the most stimulating challenges in the field of aviation. If we are to maintain our position in this field a University of Flying, forming a spearhead of research backed by practical experience into all matters concerning practical flying, is essential.

Secondly, a popular flying movement is, in a smaller but no less significant way, able to offer advantages to the nation which are both fundamental and far-reaching. Both undertakings, university and movement, are therefore vital: as vital as schools and sewers, false teeth and spectacles—even politicians' salaries and imported television programmes. They are vital to us as a nation. Therefore we as a nation must find the money to establish the former, perhaps in conjunction with the Commonwealth, and to assist the latter.

Once the fundamentals have been established let us hope that the committees and expert bodies can proceed in their worthy task of obtaining a new deal for popular flying, of sparing no effort to ensure that the air becomes as much a part of our national heritage as is the sea; that if it is still true to say "The first article of an Englishman's creed is that he believeth in the sea," then, surely, the second must be that he believes in the air.

A unique organization which has done much for advanced private-flying standards in the U.K. is the Tiger Club, one of whose 1958 air-display formations is pictured here

"Flight" photograph

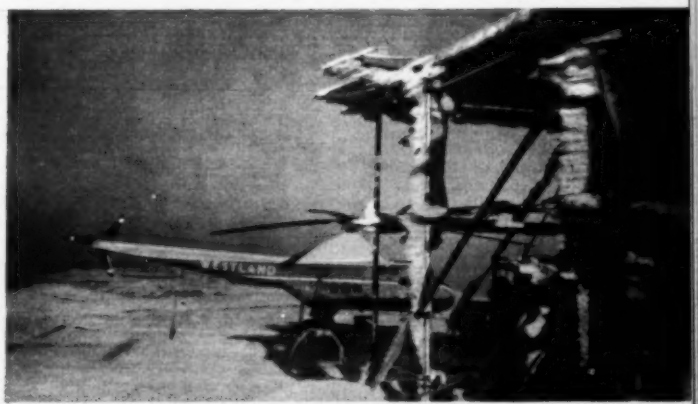
WIDGEON BEATS DRUM

WHEN the road to the Metropolitan-Vickers experimental radar station near the top of Drum (2,528ft) in Snowdonia became impassable during the recent severe weather, a Westland Widgeon was used to transport personnel and stores from the coastal village of Aber, so that the station's research programme could continue uninterrupted.

Within 24 hr of Westland Aircraft Ltd. being requested to help, a Widgeon was flown up to R.A.F. Llanbedr by the company's chief flying instructor and test pilot, John Fay. He was accompanied by service engineer Stan Rapley and their journey from Somerset took 1 hr 50 min. Operations began on Wednesday, January 14, with Llanbedr (25 miles south of Aber) being used as an overnight base. On the first day five return flights were made between Aber and the radar station; on the second, three; and on the last day (Friday, at the conclusion of the radar programme) one.

During these flights the Widgeon transported three engineers and over a ton of stores to and from the station site. The stores included food, snowshoes, batteries, first-aid and specialized equipment, and diesel oil for the generating plant. All supplies were carried inside the cabin, involving the removal of the four passenger seats (an operation taking only about two minutes) to transport a 3ft-square box.

Flying operations proved entirely successful, and although the weather continued cold with easterly winds (temperature on the mountain was −2 deg C) there was no snow and none of the fierce downdraughts normally experienced in mountainous regions.



Not the Antarctic but Snowdonia—with Westland Widgeon G-ANLW near the summit of Drum at the end of another delivery run

TURBINE TRANSPORTS

IT is a salutary reminder of the pace of airline re-equipment that no piston-engined aircraft are being built for trunk-route operation anywhere in the world. Instead, factories of six nations are pouring out a flood of new transports capable of providing a smooth, swift ride by gas-turbine power.

Largest and heaviest airliner in the western world is the Boeing 707 Intercontinental, and the first of these is portrayed in the magnificent study on the right. This machine, which flew more than 7 hr in the first two days after its initial flight on January 11, is powered by Pratt and Whitney JT-4 engines, but a considerable number of these enlarged Boeings—including the fifteen for B.O.A.C.—will have improved performance conferred by Rolls-Royce Conways. Rolls-Royce jets, in this case civil Avons, also power the Sud Caravelle (above), founder of a fashion with its aft-mounted engines and purchased by six airlines.

Below is one of the thirty-odd F-27 Friendships (two R-R. Darts) already produced by Fairchild under licence from Fokker. The example shown is in service with Piedmont Airlines, one of the largest of the American local-service operators, who will shortly have a full fleet of eight (which they call Pacemakers) serving a network of 50 towns in the eastern U.S. The fourth turbine transport pictured here is the Il'yushin Il-18 Moskva, which is powered by four 4,000 s.h.p. Kuznetsov NK.4 turboprops and can seat up to 100 passengers. Last week the Il-18 went into scheduled service on Aeroflot's northern routes, and military versions will be used by the transport arm of the Soviet Air Force.

BOEING 707
Intercontinental

СССР-115821

Straight and Level

THAT enterprising firm Thinx Electronics Ltd., designers of the Meeting Simulator (Straight and Level, December 12), have announced an important new product. Known as the Air Trumpet Mk 1, it has a wide variety of applications. And, like all good ideas, it is very simple.

It comprises a high fidelity tape-recorder, a compressed-air generator, and an immense loudspeaker. The tape-recorder is of transistorized felt, and is worn as a hat. The compressed-air generator can be easily stowed in a waistcoat pocket; and the 250-decibel loudspeaker—being automatically inflatable—is easily concealed when not in use.

By means of the Air Trumpet, claims Thinx's boss, Sir Harold Digit-Smith, "managements can throw away their costly brochures, press handouts and house magazines, replacing them by a few picked men equipped with Air Trumpets." This publicity-corps d'élite would be responsible for seeing that the firm's Message—personally dictated into the Air Trumpet by the managing director—is put across where it is most needed.

For example, an Air Trumpet operator could crouch in the shrubbery outside a customer's office-window and—without fear of detection—emit at five-minute intervals 250 db bursts of such Messages as: "*The turbofan is only a by-pass jet with a fancy new name.*" If, after three weeks, this had not sunk in, the Air Trumpet has a volume-control which can increase the noise-level to 350 db.

● During the recent blizzards, when some parts of the country were cut off, the Automobile Association offered to drop supplies from their Auster to the isolated citizens of Braemore, Caithness.

There was a most indignant objection from Mr. John L. Russell, County Clerk. He said: "If the A.A. want to provide a flying grocery service, that is their affair. . . . There are many households in isolated positions who are quite independent in wintry conditions. Independence will be destroyed, and terrific problems will be created in the future by this intervention. . . ."

"Sorry I spoke," a spokesman for the A.A. might well have said.

● Here's the rosy future envisaged by Andrew G. Haley, president of the International Astronautical Federation, when he spoke to the American Rocket Society recently:—

"We believe space exploration and settlement will dignify and enrich mankind, erasing forever devastating economic problems and affording vistas of the mysteries of creation immeasurably more challenging and interesting than we now conceive of, and so engender a measure of tolerance and compassion that man will rise above his past."

But how about the following opinion?

"The first overt or actual violation of the rules and regulations promulgated pursuant to international treaties was occasioned by the U.S.S.R.'s use of the frequencies of 20.005 and 40.002 Mc/s . . . contrary to international law. There can be no doubt as to the use of these frequencies by the satellites 1957 Alpha (Sputnik 1), 1957 Beta (Sputnik 2), and 1958 Delta (Sputnik 3) . . . On no occasion did the U.S.S.R. apply to the appropriate agencies of the International Telecommunication Union at Geneva for permission to use the frequencies 20.005 and 40.002 Mc/s . . ."

What a contrast! Who made the second statement? Had he not heard Mr. Haley's views about tolerance? As a matter of fact the speaker was Mr. Haley—and on the same occasion, but before he got to the bit about dignifying mankind and engendering tolerance.

All those cracks about space-footballs may not, judging by this picture, have been wide of the goal. It shows the "spherical medallion symbolizing an artificial planet" which is on board Russia's Planet X at this moment. If anyone ever succeeds in retrieving it, the ownership should not be hard to establish

PUBLIC ANNOUNCEMENTS

COUNCIL FOR BRITISH PLANE OPERATORS

THE COUNCIL FOR BRITISH PLANE OPERATORS give notice that they have received the undermentioned applications to operate scheduled air services:—

FROM Provokair Ltd. of 12A, Gasworks Road, Sootby, Lincs.:

APPLICATION No. 200472/35 for a Normal Scheduled Service from London to New York at a frequency of 20 flights every hour, increasing later in accordance with traffic demand, using Anson, DC-8, Boeing 707 or VC.10 aircraft, at a return fare of £18 10s. for a period of 20 years from February 1, 1959.

APPLICATION No. 200472/36 for a Normal Scheduled Service from London to Paris at a frequency of 60 flights every hour, increasing later in accordance with traffic demand, using Tiger Moth, DC-9, D.H.121 or Bristol 205 aircraft, at a return fare of £1 2s 6d, for a period of 20 years from February 1, 1959.

THESE applications will be considered by the Council for British Plane Operators, and a copy of the Air Corporations Act will be forwarded to the applicants in the meantime in case they have not read it. . . .

People have recently been so beastly to B.E.A. about their girls' uniforms that I have pleasure in complimenting the Corporation on a progressive fashion note. Traffic staff who qualify in a foreign language are entitled to wear the flag of the appropriate country in the form of a shoulder-badge. They are also entitled to an increase in pay

● *"First student ever to solo in a jet aircraft without first receiving 30 hours of primary instruction in a prop-driven aircraft was 2nd Lt. Gene D. McGinnis. He soloed in the T-37 at Bainbridge . . . after 10 hr 1 min dual instruction."* —U.S. "Air Force Times," January 13, 1959.

Steady on! In November 1955 Acting P/O. P. Foster, R.A.F., went solo after 8 hr 20 min dual instruction in a Hunting Jet Provost.

● Those airline people who claim to belong to the "low-fare school" are always complaining about artificially high rates of depreciation for modern airliners. They're probably justified; but the value of plenty of other things can drop at an even more extraordinary rate.

Four days before Christmas I heard one dustman say to another that he was now selecting the pick of last year's airline calendars. (Suitably framed, many of these would pass for genuine works of art, worth at least a few guineas. Few hearts, one imagines, could remain unmoved by such handsome scenes of faraway places.)

As I throw away the old year's calendars I always sadly reflect on the arbitrary nature of the depreciation policy that condemns such masterpieces to a premature fate. Somebody in S.A.S. must have had the same feelings, for their 1959 calendar comprises an anthology of folk tales, gloriously illustrated by Otto Neilsen, which can at the year end be converted into a hard-cover folio. Thus have the Scandinavians solved the problem of how to extend the depreciation period of a calendar beyond 12 months.

● *"Of course, we expect to have a few Thors blow up on the stand."*—Maj.-Gen. Bernard Schriever, reporting on his return to New York about progress with the Thor bases in England. Perhaps the *New Statesman* (see this page last week) was right about Thor.

ROGER BACON

Club and Gliding News

Aircraft owned and operated by Airways Aero Club seen on the apron at Croydon Airport. As reported on this page, the Airways Aero organization has just completed its first decade

THE largest membership in the history of Imperial College Gliding Club and the forthcoming acquisition of a Slingsby Eagle advanced two-seater were reported at the club's annual dinner last Friday by its captain, Julian Rushton. Last year's operations had included a gliding camp at Perranporth, and this year it was hoped to sample soaring conditions in Spain. Complimentary remarks concerning the I.C. club—also referred to as the South Ken Oligarchy or Prince Consort's Own—were voiced by Hugo Trotter of Surrey Gliding Club, and other speakers at the dinner were club secretary David Ashford and (deputizing at short notice for Mr. F. N. Slingsby) Wally Kahn.

OFFICIALS elected on Tuesday, January 20, at the inaugural meeting of the Bar Flying Club, which aims to encourage private flying among members of the Bar and students of the Inns of Court, include Mr. Christopher Shawcross, Q.C. (chairman) and Mr. Lionel Thompson (hon. secretary). A working committee was formed under the chairmanship of Air Chief Marshal Sir George Pirie to enquire into all aspects of private flying, including gliding (Lionel Alexander of Cambridge Gliding Club is one of the committee members). The club intends to use the facilities of existing flying clubs at a number of sites.

"A DISMAL record of procrastination and ineptitude" was the description applied to Mr. Harold Watkinson's handling of the Croydon Airport closure by the Croydon Airport Users' Association in a telegram to the Prime Minister on January 19. The message went on to state that this was resulting in a serious threat to the continued existence of firms and to the light-aircraft movement in Britain, including business and executive flying internally and to the Continent. A recent telegram to the Minister had not even been acknowledged, and "we plead for immediate and realistic action at highest level and suggest strong grounds exist for public inquiry into Minister's dogmatic stand against well-informed opinion."

The "recent" telegram to Mr. Watkinson had been sent on January 6, and read as follows:—

"Croydon Airport Users whilst anxious in the interests of survival to achieve early solution to problems resulting from airport closure cannot do so on basis of Biggin Hill Air Ministry terms and conditions which are economically prohibitive. Unanimous opinion all users is that they prefer to terminate their business on Croydon's closure rather than drift into bankruptcy at Biggin. They appreciate your great difficulties but feel that you cannot wish upon them such disaster and call for an early top-level meeting to reconsider the rehousing of Croydon tenants with particular reference to those affected by Notam 897/1958."

At the time of going to press, it appeared that club flying at Croydon would cease on January 31 and that Surrey Flying Club and the smaller groups would move to Biggin Hill one or two weeks later.

THE first production Slingsby Swallow, delivered last autumn to the Border Gliding Club, South Africa, set up a remarkable performance earlier this month in the hands of club member John Andrews. On his first-ever cross-country flight, on January 5, Andrews achieved no less than 190 miles from the club site at Victoria West to Molteno. This distance completed his Silver C and established his Gold C distance leg. Four days later, Andrews completed a goal flight of 200 miles to Edenburg, attaining a height of 16,500ft in cloud *en route*, thus completing his Gold C and obtaining a goal Diamond in addition. This performance by Andrews probably represents the shortest time ever recorded from first cross-country to Gold C with Diamond. Andrews is the fourth pilot in the Union of South Africa to obtain a Gold C; one of the others, Boet Dommisse, completed his triple Diamond on January 8 with a flight of 330 miles in a Moswey 4. The Border Club have reported to Slingsby Sailplanes that Gold C flights are comfortably within the capabilities of the Swallow and that, given favourable conditions, the machine can attain 500 km.

A TOTAL of almost 1,000 launches during 1958 was reported at the annual general meeting of Halifax Gliding Club on January 22. Ten members had achieved first solos, mostly towards the end of the club's stay at Sherburn, and the first *ab initio* had been John E. Haigh, president of the club. Since leaving Sherburn the club had been hard at work in the search for a new site, and negotiations had been opened for one nearer to Halifax. The club fleet at present stands at 2½ aircraft—one T.31, one Tutor and half of a Cadet. Officials re-elected at the meeting were J. E. Haigh, president; M. H. Lickess, chairman; F. Lees, secretary; D. J. Westerside, treasurer; and G. Hoyle, equipment officer.

"A MOST critical period" in the life of Airways Aero Associations Ltd., the company controlling Airways Aero Club, has now been reached, according to the annual report to the directors presented on January 11 by Mr. J. O. H. Lobley, managing director. "The Ministry has decreed that flying will cease at Croydon on January 31, 1959," Mr. Lobley stated, "and, if we expect to continue to earn revenue, the company's operations must move to Biggin Hill. Negotiations for hangarage and office accommodation is in the hands of a consortium of Croydon users and no firm *modus operandi* has yet been reached."

Ten years' activity in both commercial and club flying spheres were completed by A.A.A. by the end of last year. The company was formed in 1947 and started operations in 1948 with aircraft at Hurn, Whitchurch and Denham. The first two bases were closed in 1950 and the club concentrated at Denham with a Magister and Aeroncas. Two years later the company re-equipped with five Auster Aiglet Trainers and early in 1953 moved to Croydon.

At present the club has a fleet of eight Chipmunks, two Aiglets, one Consul and one Proctor at Croydon, plus a Chipmunk and an Auster at Denham. There is a total membership of 558 and the aircraft have flown a total of 40,417 hours in the ten-year period. Since 1950 a total of 159 P.P.L.s, 129 commercial licences and 63 instrument ratings have been obtained.

On the commercial side, Airways Aero has undertaken a number of sponsored training schemes. The first was one to train selected navigators as B.O.A.C. pilots; this started in 1950 and 42 pilots obtained commercial licences after 6,300 hours' flying. The next scheme began in 1953 and involved training radio officers to become pilots for B.E.A.

In 1954 the newly formed Deutsche Lufthansa approached A.A.A. to supply flying instructors to train pilots for the German airline. In the following year a number of Airways instructors were seconded to Hamburg; and in 1956 flying instructors were provided to organize the flying training school which the German airline was building at Bremen.

M.T.C.A. approval was given in 1955 for the provision of courses by the Airways Aero organization, in conjunction with the London School of Air Navigation, for P.P.L., C.P.L. and instrument rating. At that time this was the only school in the country to have approval for all three. In recent months B.O.A.C. has provided an increasing number of pilots requiring licence-renewal.

Another contract, awarded to the company in 1954, was to advise the Kuwait Government in the selection and purchase of suitable training aircraft and to deliver eight of these aircraft from the U.K. to Kuwait. Various other delivery flights of light aircraft to various parts of the world have been made, and 1,703 hours have been flown on A.T.C. training, during which 47 cadets obtained P.P.L.s.

Airways Aero Associations now has a staff of five full-time flying instructors, with Mr. L. W. Wenman as manager and Mr. E. N. Boggis as C.F.I. There is also a Link trainer section in which, since 1954, 3,538 hours' instruction have been completed.

INTRODUCTORY talks for newcomers to gliding are again being given this year at the Kronfeld Club, London. The first will be by Ted Stark of the Midland Gliding Club and will take place on Tuesday, February 3, at 8 p.m. These talks are free of charge and will take place on the first Tuesday of each month.

DESIGNER of the Fairey Tipsy Nipper and managing director of the Belgian Fairey company, Mr. E. O. Tips has informed us that the ex-works price of the 40 h.p. Hepu-powered Tipsy Nipper, fully tested and ready to fly away, is £818 and not £1,000 as stated in the article "Pro-built" in our January 16 issue. Recent tests, he writes, have included spins (up to eight turns in each direction, with immediate recovery on centralizing the controls), dives up to 155 m.p.h. and pull-outs up to 7.4g.

Sundstrand-pattern constant-speed drives are in full licence-production at the English Electric aircraft equipment division plant in Bradford, Yorks. These drives are doubtless destined for Vulcan B.2 bombers

Paralleled A.C.

THE CASE FOR CONSTANT-FREQUENCY SYSTEMS

STEADILY increasing needs for electricity in aircraft are reflected in the introduction of higher-capacity systems. Initially the aircraft electrical industry merely increased the voltage of D.C. systems, but at the same time several manufacturers began exploring the apparently more promising A.C. field. The pros and cons of D.C. and A.C. have been widely discussed in previous articles, and this essay roundly advocates A.C. The author is a member of English Electric's Aircraft Equipment Division. This Bradford concern was one of the first in Britain to enter the A.C. field, by licence-producing the American Sundstrand constant-speed drive ("Flight," January 21, 1955), and associating with it a complete A.C. system for the Vulcan B.2. This is undoubtedly one of the most proven fully-paralleled systems now available anywhere

By T. E. HEYS, A.M.I.E.E.

SEVERAL constant-frequency generating systems are now being accepted as standard equipment on advanced civil and military aircraft on both sides of the Atlantic. It is the purpose of this article to discuss the reasons for the introduction of such systems, and to outline certain essential functions required from the electrical installation of a large modern aircraft.

Towards the end of World War 2 increases in both operating altitude and electrical demands revealed serious limitations in aircraft D.C. installations. The D.C. generator is prone to excessive brush-wear at high altitudes—a problem which, in the writer's opinion, still defies solution—and when designed to supply larger amounts of power over a wide speed range the machine becomes large and heavy.

A further difficulty arises in the design of protection devices. These should de-energize a faulted generator before voltages and currents can reach dangerous magnitudes; yet, at the same time, they should not detect the transient effects of heavy load changes and must provide fuse-clearance of load faults. In the event of a regulation failure at full r.p.m., the D.C. generator can produce voltages five times greater than normal. Fault currents under short-circuit conditions very rapidly reach dangerous values, and circuit-breakers capable of rupturing such currents cannot fail to be large and heavy.

In this country performance limitations were partially met by increasing the D.C. voltage from 28 to 112, or by introducing wide-speed-range alternators, the outputs of which were converted into D.C. by means of large transformer/rectifier units. Nevertheless, in the first case brush-wear remained a problem, and in the other facilities had to be incorporated for cooling the TRUs. In both cases the faulting characteristics of the D.C. system still prevailed.

The ability of a generating system to clear faults before serious malfunctioning occurred became of vital importance with the introduction of fully powered flying controls. A further problem concerned the increasing demands by radio and radar for A.C. power within fine tolerances of voltage and frequency. The situation soon arose in which a chain of supplies was needed, comprising a wide-speed-range alternator, a transformer/rectifier unit and an invertor, each link requiring its own control and protection equipment.

It is a contrast to consider certain features of the A.C. generator designed to function at constant frequency. First, it has a maximum output voltage rarely in excess of 150 per cent of the normal controlled value, and a short-circuit capacity of about 500 per cent of the rated current. These limits make the design and construction of A.C. fault-protection devices much simpler than for D.C. equipment. Second, since the size of a generator is determined by the output requirement at minimum speed, the constant-speed generator is of necessity smaller than the corresponding wide-speed-range machine. This has an important bearing on the time-constants of the machine, and on the consequent ability of the output voltage to recover rapidly from the effects of large changes in load.

One of the main advantages of a system employing constant-frequency A.C. generators is that they can be arranged to operate in parallel. This provides "stiffer" bus-bar voltage and frequency, in that transient effects are small and quickly disappear. Moreover, the complete loss of any one generating channel does not require the operation of any emergency load-transfer device. All main components are functioned each time the aircraft is made ready for flight, not merely in an emergency.

Against the fully paralleled system is the argument that there could be some fault condition which would cause failure of the entire system. Such a disastrous situation can be avoided by splitting the installation into two virtually independent sections; for example, a four-machine installation could operate as two paralleled systems with two generators each. Emergency loading capacity must be considered; in order that system utilization be unaffected by the loss of one generator, each machine of the fully paralleled quartet must be capable of accepting 33⅓ per cent more than its normal share on full load. In the split systems each generator must be able to carry twice as much as its normal share of the section on full load.

The essential features of a constant-frequency system can be listed as follows: A.C. generator; constant-speed drive; voltage control; frequency control; fault protection; and load-sharing between generators operating in parallel. The constant frequency may be obtained by means of either a separate prime mover or a speed-conversion device coupled to a main engine. In each case the frequency-deviation limits of about ± 1 per cent, with transient recovery time of about 0.25 sec, demand speed-control of high fidelity.

If the drive is to be used on multi-generator systems it is necessary for a free-wheel device—usually mechanical—to be incorporated. This allows a generator to "float" across the bus-bars, in the event of an engine shut-down or a fault condition causing the machine to develop a lower than normal frequency, until the condition of under-frequency detection occurs. If the free-wheel were not incorporated the generator, functioning as a motor, would become overloaded and eventually pull out of synchronism in its attempt to drive the engine. This would give rise to severe disturbances to the system voltage and frequency, and subject the generator drive-shafts to excessive torque. Consequently the constant-frequency systems of many American aircraft, and those going into production on the British V-bombers, incorporate a hydro-mechanical constant-speed drive which embodies a free-wheel capable of transmitting the equivalent of 30 kW continuously and 60 kW for a short time in the forward direction. In the reverse direction the generator draws 2 kW from the bus-bars, a figure which includes the losses of the generator. This free-wheel weighs about 4 oz.

This is a function which has been the subject of recent comment and is dealt with in some detail in the appendix to this article. It is sufficient to state here that, when A.C. generators are operating in parallel, it is necessary to provide means of equalizing the real, or power, loading and the reactive, or idle, loading between the machines. The greater the accuracy of load-division the closer the system full load can be brought to the nominal figure without causing any one generator to become overloaded.

The system which comes to mind when paralleled A.C. generators are discussed is the National Grid, in which many machines are connected to the bus-bars—so many, in fact, that no single generator can appreciably affect the system frequency or voltage, and an "infinite bus-bar" condition is approached. In such a system, loading specifications based on statistical information are issued by area controllers which merely inform the power stations of the load and power-factor requirements at any one time. Each generator prime-mover governor setting is then adjusted to give the specified power delivery, and the generator field excitation adjusted to give the corresponding power-factor. The individual load specifications are so planned that the system voltage and frequency remain at the correct values.

In the case of an aircraft installation the number of generators rarely exceeds four, so that any change in a prime-mover governor setting, or in a field excitation level, will affect the system frequency or voltage respectively; the differential effect of load-sharing circuits ensures that such effects are minimized. For instance, if a generator is required to accept 30 per cent more than its balanced share of load, then in a four-channel system the other machines would each sense a 10 per cent reduction. The corresponding governor adjustment signals would be such as to give an overall system frequency change of zero.

Since power and reactive load distributions are functions of prime-mover governor and excitation control respectively, the former is applied at the frequency controller and the latter at the voltage regulators. Care must be taken to isolate load unbalance components so that, for example, the power load control circuit will not respond to out of balance of reactive loading over which it has no control.

Fault Protection

As already mentioned, airborne electrical systems have reached a degree of importance such that the safety of the aircraft depends on their correct functioning. For this reason great care must be applied to fault-detecting devices, to ensure that all faults which could lead to serious system-malfunctioning are sensed and measures taken to isolate them. The basic faults against which protection should be incorporated are: over and under voltage; over and under excitation—parallel operation; over and under frequency; line faults; regulator instability; and unbalance of load between paralleled generators.

Over and Under Voltage. These are conditions which can occur on a generator as a result of voltage-regulator circuit failure. The over-voltage detector should have an inverse time/voltage characteristic of a form which will not allow tripping under heavy load or fuse-rupturing transients, and yet will cause a faulted machine to be shut down as rapidly as possible. A typical characteristic would vary from 0.2 sec for a 150 per cent fault to 3 sec for a 110 per cent fault.

The under-voltage detector normally has a fixed delay time of about 3 sec, and functions on a 90 per cent fault. Again the time-delay prevents nuisance-tripping under transient disturbances. It must be short enough to prevent a generator which has lost its excitation, and thus become a low impedance on the bus-bars, from remaining on line long enough to cause overheating of the remaining machines.

Over-under Excitation. All over-under voltage-sensing devices sense the common bus-bar conditions when channels are connected in parallel. Measures must therefore be taken to ensure that only a faulted generator would be shut down. An excitation fault produces a pronounced out-of-balance of reactive loading which can be used to produce a discriminating signal for this purpose. The circuit is arranged to have similar characteristics to the reactive load-sharing loop.

Over-under Frequency. A generator must be removed from the bus-bars when a sustained abnormal frequency condition of, say, ± 10 per cent occurs. This can be detected at the prime-mover by means of a speed-sensing device arranged to signal the control equipment to remove the rogue channel from the line.

Line Faults. Feeder and alternator short-circuit faults can be detected by a Merz-Price circuit, in which currents at different points in the lines can be compared by means of current transformers. A line-to-line or line-to-neutral fault between the monitoring points causes a difference in currents which is made to operate the detector.

Main feeder open-circuits do not cause bus-bar voltage changes of sufficient magnitude to cause an over-under voltage detector to operate on a paralleled system. However, the asymmetry of the system line currents produces considerable negative phase sequence components which can be detected.

Regulator Instability. The time-constants of generators and voltage regulators rarely allow the combination to form a basically stable servo-loop. In such cases stabilizing circuits are included between the alternator and regulator. A failure of one of these circuits would therefore cause the channel to become unstable, a condition in which the generator output voltage becomes severely modulated. This effect can be detected by means of a low-pass filter, which must be designed to detect the modulation of the bus-bar voltage of a parallel system when one generating channel becomes unstable. The bus-bar voltage disturbance brings about a corresponding fluctuation of reactive loading which is sensed by the over-under excitation discriminating loop. This effect can be used to make the instability detector circuits selective, so that only a faulted generator is shut down.

Load Unbalance. The consequences of load-sharing circuit failures can be detected by a simple current transformer loop which compares the load currents of the respective generators. The circuit operates when the line current passed by any one machine differs by a predetermined amount from the average of generator line outputs.

The above faulting provision represents the minimum necessary to ensure that no one fault can cause a dangerous system malfunction. They can be augmented by further fault-detector circuits, but careful consideration should be given to the effectiveness of each added circuit and the extra hazard of "something else to go wrong." The aim of any system-designer should, of course, be to achieve maximum effectiveness of operation and protection by the simplest means, and with the minimum of components.

APPENDIX

Functioning of Load-sharing Circuits. The influence of load-sharing circuits can be illustrated by considering various cases of generators operating in parallel:—

(1) *Generators at Constant Speed and with Constant Excitation:* This arrangement is shown on Fig. 1. Let E_1, E_2, Z_1 and Z_2 be the respective generated phase voltages and synchronous impedances of the two generators; let Z_L be the common load impedance; let Y_1, Y_2 and Y_L be the corresponding admittances (an admittance is the reciprocal of an impedance, and is used here to simplify the reasoning); let V be the bus-bar voltage and I_1, I_2 and I the circuit currents.

Then $I_1 = \dfrac{E_1 - V}{Z_1} = (E_1 - V)Y_1$ and similarly for I_2, so that

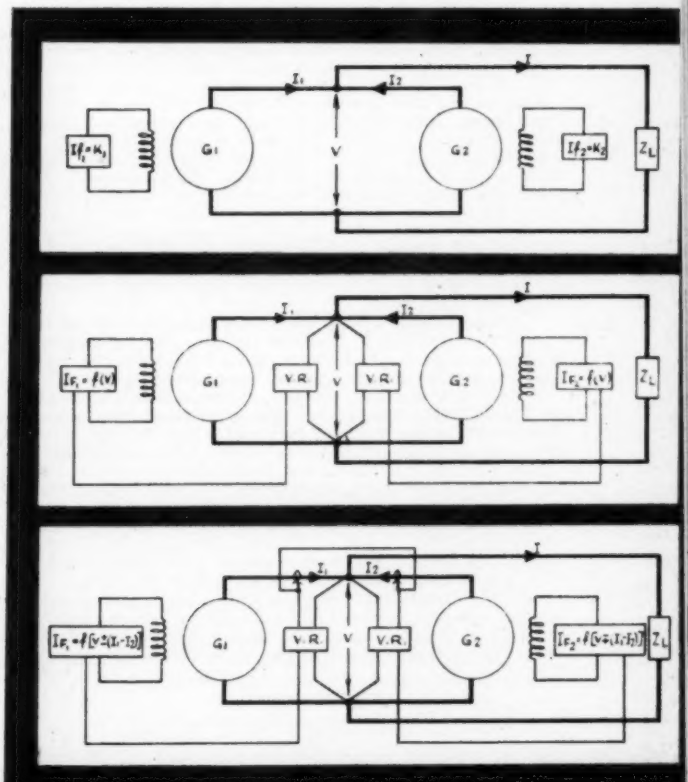
$$I = I_1 + I_2 = E_1 Y_1 + E_2 Y_2 - V(Y_1 + Y_2)$$

also $I = \dfrac{V}{Z_L}$ or VY_L

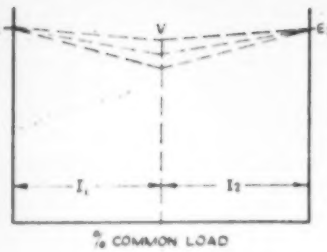
hence $V = \dfrac{E_1 Y_1 + E_2 Y_2}{Y_1 + Y_2 + Y_L}$

This shows that the bus-bar voltage depends upon the amount of load connected to the system; the division of load depends on the characteristics of the machines. When $E_1Y_1 = E_2Y_2$ then $I_1 = I_2$; Fig. 4 (overleaf) shows how two generators would share the common load when connected as above.

(2) *Generators Regulated to Produce Constant Bus-bar Voltage.* Fig. 2 shows the connections for this case. The load-division between the generators would be very poor, since it is not practicable to manufacture *identical* equipment and use exactly symmetrical circuits. That is to say, one regulator will not respond to a control signal precisely like another, one generator will not have exactly similar characteristics to another and one group of feeders will not have the same impedance as another. The circuit of Fig. 2 could perhaps be adjusted to give balanced loading under one condition of loading and temperature, but any slight deviation



The three diagrams on the right are: Fig. 1 (top), generators under constant excitation; Fig. 2 (centre), generators with constant (regulated) bus-bar voltage; and Fig. 3 (bottom), generators at constant bus-bar voltage conditions with provision for excitation trim to give load sharing



If $E_1 = E_2$
$Z_1 = Z_2$
THEN $I_1 = I_2$

Fig. 4 (left), pictorial representation of load-sharing between generators at constant excitation

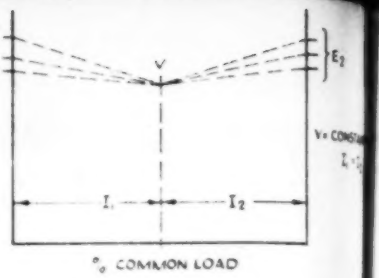


Fig. 5 (right), load-sharing between generators with excitation adjusted to give constant bus-bar voltage and equal division of the load.

PARALLELED A.C. . . .

from this state would cause the channel whose regulator tended to control at the slightly higher level to take on all the load, since this regulator would strive to increase the bus-bar voltage and the other regulator would endeavour to decrease it.

(3) *Generators Regulated to Produce Constant Bus-bar Voltage, with Provision for Equal Division of Load.* This case is shown in Fig. 3, and the effect on generated voltages and output currents in Fig. 5. Here the excitation levels of both machines are trimmed by a signal proportional to any deviation from the condition $I_1 = I_2$ so as to reduce the error. The load-sharing signal ensures that a higher-level controlling regulator will (apparently) sense this point by receiving a bias signal added to the bus-bar voltage control level, and, conversely, a lower sensing regulator will receive a subtractive bias signal.

Effects of Temperature. Load-sharing circuits are designed to maintain the equality of load division within reasonable limits, not only for all loading but also under all environmental conditions. This may be illustrated by citing the case of a two-generator system specification, which includes the following clauses: bus-bar line voltage 200 V ± 1%; generator line-current 0 to 100 amp; ambient temperature range − 70 to + 70° C; load sharing; $I_1 = I_2$ ± 3% at 20° C; and $I_1 = I_2$ ± 10% from − 70 to + 70° C.

Consider the conditions where regulator adjustments have been made at 20 deg C, such that the terminal voltages of the two machines when running separately are $V_1 = V_2 = 200$ V. When connected in parallel the bus-bar voltage V remains at 200, $I_1 = 90$ amp. and $I_2 = 91$ amp. Suppose that temperature effects cause the reference of one regulator to change slightly, so that at 70 deg C the device controls at 202 V (the other regulator remaining unaffected). Hence $V_1 = 202$ V, $V_2 = 200$ V. When connected in parallel, the generators would give a bus-bar voltage at this temperature of $\frac{V_1 + V_2}{2} = 201$ V. The load-sharing circuits ensure that one regulator senses an effect equivalent to 202 V and the other 200 V, the division of load now being, say, $I_1 = 95$ amp., $I_2 = 86$ amp. Without the load-sharing circuits one regulator would endeavour to raise the bus-bar voltage to 202 and the other would try to reduce it to 200, and a divergent condition would arise, resulting in the higher controlling channel eventually taking all the system load and endeavouring to run the other generator as a motor.

The designer of aircraft electrical equipment strives to achieve high effectiveness of operation and complete protection by the simplest means with a minimum number of components. In the writer's view, these requirements are best met at the present stage of development by the constant-frequency system. It lends itself readily to the introduction of static devices—such as the transistor—in the control circuits, and obviates the necessity of energy-conversion devices, such as the inverter, to meet the growingly stringent demands for a precise constant-frequency supply.

SPACE EXPLORATION DISCUSSED

"CROSSING Fifth Avenue is not an enterprise one enters into lightly, but we do it just the same." These were the words Dr. Fred Whipple used to conclude a lively panel discussion about the problems of space exploration before members of the International Society of Aviation Writers in New York City on January 14. Dr. Whipple, who is director of the Smithsonian Astrophysical Observatory, was joined on the panel by Dr. Lloyd V. Berkner, chairman of the Space Science Board of the National Academy of Science, Dr. Homer Joe Stewart, director of programme planning and evaluation of the new National Aeronautics and Space Administration (NASA), and Dr. Donald L. Michael, senior research associate of Dunlap and Associates. Chairman of the meeting was Jerome Lederer, managing director of Flight Safety Foundation, and other speakers included Dr. Otto H. Schmitt, biophysicist from the University of Minnesota.

Dr. Whipple remarked that aircraft faced "serious" hazards during landing and take-off, with no real worries in between. Space travel, on the other hand, would "make your hair stand on end" from start to finish. He drew a mental picture of the predicament of the first man about to leave our planet "sitting 200ft in the air, on top of 100 tons of high explosive." That equipment failure could not be tolerated was an obvious space-travel requirement. After launching, the major problems to be solved were radiation and navigation or "course control." Collisions with sizeable meteors was a calculated risk, but erosion from micrometeor dust would not be serious (it would take about a year for meteor dust to erode a window glass enough to make it "foggy" in appearance).

Concerning the Van Allen radiation belts revealed by data from Pioneer 3, Dr. Whipple speculated that since these regions were weakest near the Earth's magnetic poles, it might be necessary to route space-ships out through this low-radiation escape path.

Dr. Lloyd V. Berkner, who is sometimes called "the father of the I.G.Y.," made an intriguing speculation about the problem of Moon landings and bringing man back. He suggested that the first man on the Moon might be landed with no provision for return. Perhaps he would be landed with adequate supplies before any firm plans had been made as to how to bring him back. Technology would then retrieve the explorer after it had learned how.

The economics of space experiments was due for improvement, according to Dr. Stewart of NASA. The successful Vanguard four-pound satellite was placed in orbit by a 22,000 lb vehicle. This was a ratio of all-up weight to payload of 5,500:1. The Project-Score Atlas ratio was about 1,600:1. The early American satellite launching vehicles had been costing about $10-12 per lb of all-up weight, or about $10,000 per lb of payload placed in orbit. This did not include support costs for tracking, launching pad, etc. If Soviet costs were similar, the Sputnik 3 launching vehicle might have cost in the order of $30,000,000 by this yardstick. But considerable improvement in cost and payload ratios was in prospect. Dr. Stewart believed that a ratio of take-off weight to payload of 40:1 was within reach and that 25:1 was possible. He estimated that the cost of putting one pound of payload into orbit should drop to about $300.

Using existing rockets as boosters for space vehicles showed promise. Dr. Stewart stated that, making some structural changes and adding an upper stage could convert IRBMs to launch one-ton satellites and ICBMs to launch 4- or 5-ton satellites. The recently announced Project Mercury would utilize an Atlas to boost a manned capsule into space, and the million-pound rocket engine now under development would open entirely new space-flight capabilities within the next decade.

A sobering point of view on space exploration was injected by Dr. Donald L. Michael. While science was capturing the headlines and winning the endorsement of an excited public, he said, mankind should be careful not to overlook the moral and material implications of the impact of spaceflight on society. Burgeoning world population might require revised allocation of national resources. Every cent spent for space exploration must be weighed against money required to improve the lot of mankind on earth. People might demand more immediate returns for their energies than the results of an exploration of Venus. Scientists and engineers should not presume that space exploration was the ultimate of technology, society and human progress. While making spectacular achievements in space, we must also improve the values and aspirations of mankind.

P. E. V.

RETROSPECT

From "Flight" of January 30, 1909

A CURIOUS claim was heard at the Wandsworth County Court on Monday, when a labourer named Reynolds sued Messrs. Short Bros. for compensation on account of injuries received in connection with a balloon ascent. According to his evidence, he went to the Gas Light and Coke Co.'s balloon ground and was beckoned, with others, by Mr. Short, and told to hold on to the basket of a balloon which was being prepared for an ascent. The signal to "let go" was given, but he did not hear, and so he was carried up to a height of about 25ft above the railway arches, and then, letting go, dropped to the ground. Since then he had not been able to follow his occupation as a labourer. Dr. Da Costa stated that in his opinion the injury was a slight one. Mr. Eustace Short said that he did not beckon to the defendant, and when he gave the order to let go the applicant hung on.

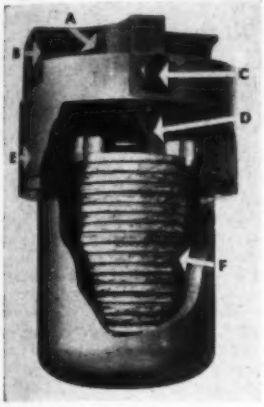
The view that there was no contract of service was upheld, and judgment given for the respondents, with costs.

THE INDUSTRY

Palmer-Parmatic Filters

AT the time of the Farnborough Show it was announced that Palmer Aero Products Ltd. had acquired manufacturing rights for the filters designed by a well-known Canadian firm, Parmatic Engineering Ltd., and it is now possible to give details of the range available to the aircraft industry.

The basic range covers a "virtually unlimited" number of fluids, at temperatures from −55 deg C to +200 deg C and at operating pressures up to 6,000 lb/sq in. Illustrated here is the Model D.1021, similar to that used in the flying-control hydraulic system of the CF-100. Flow is 7 Imp gal/min at 3,000 lb/sq in, filtering D.T.D. 585 at −55 deg C to +150 deg C. Degree of filtration is 5 microns absolute and pressure-drop is 15 lb/sq in at 35 deg C.



Filter in part section

(A) is a by-pass relief valve, so located as to prevent re-circulation of previously filtered dirt. It has a knife-edged seal which minimizes the chances of particles being trapped, and its lightness in relation to the spring load gives minimum g sensitivity. Cracking pressure is 80 ±20 lb/sq in. At (B) are ports machined to take AGS 3017 and American AND Unions. (C) is a semi-automatic air bleed which operates when the bowl is removed and replaced (some models have fully-automatic air bleeds), and (D) is an automatic cut-off valve which, together with the bowl design, prevents spillage of fluid on removal of the bowl. It is impossible to remove the filter bowl without closing the cut-off valve and, conversely, impossible to reassemble without opening it. No spring loads oppose the flow through the cut-off valve, and this, combined with smooth passages, contributes to the low pressure-drop through the filter. Neither valve relies on synthetic seals, and both can operate with a wide range of temperature and fluids. At (E) are the aluminium-alloy head and bowl, impulse fatigue-tested under a pressure rise of 0 to 3,000 lb/sq in, 100,000 cycles at 6 c.p.s. sinusoidal wave form. Height is 6½in, diameter 4½in and total weight 6½ lb. (F) is the sintered bronze permanent, cleanable filter element; throw-away types can be used if preferred. This element, it is stated, will stand pressure impulses in either direction of up to 1,000 lb/sq in.

Features available, but not illustrated in this model, include a magnetic filtration stage; a by-pass warning or differential pressure-sensing device; and a wide choice of positions for inlets and outlets providing either vertical or horizontal connections as required.

Palmer Aero Products Ltd. are at Herga House, Vincent Square, London, S.W.1.

Keeping It Cool

PRODUCED by the Northern Aluminium Co. Ltd., Noralduct is aluminium alloy sheet with internal systems of passages and ducts. Particularly designed for heat-transfer equipment of all kinds, it has possibilities for use in other fields, and among its aeronautical applications are those of skin-cooling panels for supersonic aircraft and integrally cooled covers for pressurized radar equipment.

The method of manufacture is extremely ingenious. A sheet of Noral alloy is superimposed on another, on which a fore-shortened impression of the required duct pattern has been printed, by a silk-screen process, in "stop-weld" ink. The sandwich is then passed through a rolling mill. The pressure exerted causes the alloy to unite in all areas except those that have been inked. The rolling of what is now virtually a single sheet is continued until the required final gauge and size have been obtained. The sheet is then held between rigid plain platens and the printed areas are hydraulically inflated, thereby becoming ducts and chambers of the pattern required. Extremely complex patterns can be reproduced.

The company's head office is at Bush House, Aldwych, London, W.C.2, and its Sales Development Division is at the works at Banbury, Oxfordshire.

Smiths Re-alignment

NEW divisions, known as Smiths Aviation and Marine Divisions, have been formed by S. Smith and Sons (England) Ltd. and a co-ordinating Board appointed to direct their activities. The divisions are made up of the following main and subsidiary companies: Smiths Aircraft Instruments Ltd.; Smiths Industrial Instruments Ltd.; Waymouth Gauges and Instruments Ltd.; David Harcourt Ltd.; Kelvin and Hughes Ltd. and subsidiary companies; and that part of the business of S. Smith and Sons (England) Ltd. devoted to the manufacture or sale of aviation and allied products. All these constituent organizations will continue to function through their respective Boards and executive managements.

Mr. G. B. G. Potter

The chairman of the co-ordinating Board is Mr. Ralph Gordon-Smith (chairman and managing director of S. Smith and Sons); the managing director is Mr. G. B. G. Potter, B.Sc., M.I.Mech.E., F.R.Ae.S. (managing director of Kelvin and Hughes Ltd.); and the other Board members are Mr. L. A. Morgan, A.F.R.Ae.S. (director and general manager of Smiths Aircraft Instruments Ltd.), W/C. H. M. Samuelson, R.A.F.O., A.M.I.E.E. (technical sales director of Smiths Aircraft Instruments Ltd.), and Mr. G. S. Sturrock, M.A.(Cantab.), F.C.I.P.A. (commercial director of Kelvin and Hughes Ltd.).

Smiths Aviation and Marine Divisions will have their administrative headquarters at Kelvin House, Wembley Park Drive, Wembley, Middx.

Supplementing Flexflyte

SINCE its introduction to the aircraft industry about two years ago, Flexflyte lightweight ducting—in a size range now extending from half-inch to 8½in bore—has been adopted in its standard forms for many current military and civil aircraft. Its manufacturers, Avica Equipment Ltd., Mark Road, Hemel Hempstead, Herts, are now devoting a great deal of effort to an ever-increasing number of silicone rubber special shapes, to supplement Flexflyte and other Avica products such as stainless steel bellows and flexible pipelines.

IN BRIEF

The new head office address of Microcell Ltd. is Ingersoll House, 9 Kingsway, London, W.C.2 (telephone Covent Garden 1262).

* * *

Mr. L. Malec, M.B.E., A.R.Ae.S., has resigned as head of the sales and service division of Air Trainers Link Ltd. and is being succeeded from February 1 by Mr. N. J. C. Hill, A.M.I.Mech.E., M.C.A.I., A.R.Ae.S. The company has also announced the appointment of Capt. D. Wilson as sales manager.

* * *

We regret to learn that Mr. Joe Lea, assistant managing director of Avica Equipment Ltd., died on January 15 after a short illness. He joined the company on leaving the Royal Navy in 1946, and had played an important part in Avica development since that time.

* * *

Mr. J. A. Hayward, who since demobilization from the R.A.F. in 1946 has been with the Firth Cleveland group as a director of overseas companies in South Africa, the West Indies, Canada and the U.S.A., has now in addition been appointed to the Board of Firth Cleveland Ltd., of which Mr. C. W. Hayward is chairman and managing director.

* * *

Graviner Manufacturing Co. Ltd. has formed a company in Dusseldorf to look after its interests in Germany. The chief of these are airborne and industrial fire- and explosion-protection equipment, diesel engine oil-mist detection and certain products in the nuclear-energy field; and the name and address of the new Graviner-owned company is Deugra Gesellschaft fur Brandschutzsysteme m.b.H., Breite Strasse 3, Dusseldorf.

* * *

Mr. N. M. Clark, B.Sc.(Eng.), A.C.G.I., A.M.I.Mech.E., has been appointed chief engineer of Power Jets (Research and Development) Ltd. in succession to Mr. J. Hodge, who has joined the Holman Group. Mr. Clark has been with Power Jets since 1955, when he became a senior engineer in their consultancy department. His first appointment (in 1947) was with W. H. Allen Sons and Co. Ltd. of Bedford, where he was closely associated with the design of the first Allen gas turbines under Mr. A. W. Pope and was later appointed gas turbine development engineer.

Correspondence

The Editor of "Flight" is not necessarily in agreement with the views expressed by correspondents in these columns. Names and addresses of writers, not for publication in detail, must in all cases accompany letters.

A Protest from Holland

IN Holland today there is a general anti-British feeling: Press, radio and television have given a lot of publicity to the British decision to allow K.L.M. Royal Dutch Air Lines to fly to Singapore only once a week. The Dutch Minister of Foreign Affairs, Mr. Luns, said on television that in the last eight years England had refused *every* request from K.L.M. or the Dutch Government for landing rights. Even in 1937, K.L.M. flew three times a week to Singapore.

It seems unfair that in these days, with the enormous growth of civil aviation, the Dutch should be restricted to only one flight a week, especially since K.L.M. had to give up her historical route from Amsterdam to Java.

In the Dutch Press a lot has also been written about the British export of Gannets to Indonesia. It has been said that originally Indonesia ordered the Bréguet Alizé in France; but France, in sympathy with Holland, refused to deliver them. Indonesia now turned to England and England said yes.

All in all, aviation matters are the cause of the relationship between England and Holland being at a very low point at the moment. We can only hope that this will be bettered in the near future. I think it should not be forgotten that Holland is still a good client for the British aviation industry, in view of the Viscounts and Twin Pioneers of K.L.M., the Friendships with their many British parts, the Hunters and Meteors of the Air Force and the Sea Hawks of the Navy. If a general anti-British feeling grows, this country may order her aircraft elsewhere in the future.

Maarn, Holland. HUGO HOOFTMAN.
(Air Correspondent)

Gloster Eclipse?

READING in your Golden Jubilee number of the future plans of the Hawker Siddeley Group (p. 3) I was reminded that the notable exception among the firms in the Group with aeronautical projects is, of course, the Gloster Aircraft Co.

In spite of the fact that the Javelin contract was shared between Gloster and A.W.A. this system does not, apparently, work the other way round. It would seem that the history of Glosters can now be written while the factory where so many famous machines have emanated is turned into a trading estate for general engineering.

Malvern, Worcs. GEOFFREY BELLAMY.

[Possibly our correspondent is unnecessarily despondent. Gloster have in fact had a small but important share in the Argosy; their Technical Developments Division, too, are very much in the aviation business. It may be assumed that any new developments in the Hawker Siddeley aircraft order book might well alter the present situation.—Ed.]

Austrian Air-victory Scores

IN Riccardo Cavigioli's excellent book *L'aviazione austro-ungarica sulla fronte italiana, 1915-18*, Mr. R. Bowyer and my good friend Maurice Austin will find confirmation of the fact that Frank Linke-Crawford flew a Brandenburg D.I. On page 47 there appears a reproduction of a page in Linke-Crawford's personal photograph album, showing four air-to-air views of his Phönix-built Brandenburg D.I. Against these photographs he had written "Der rote Kopf" (the red head); Cavigioli thought that these words probably indicated that Linke-Crawford wore a red flying helmet.

Again, on page 190 of the same book there is a photograph of Linke-Crawford standing beside an Ufag-built Brandenburg D.I, 65.54. On the same page is an illustration of Godwin Brumowsky in the cockpit of 65.53. Cavigioli says that 65.54 was Linke-Crawford's aircraft, which agrees with Mr. Bowyer's information.

According to Cavigioli, Linke-Crawford also flew an Albatros D.III at one time. Another illustration (page 49) depicts Brumowsky and Linke-Crawford in front of their D.IIIs; the aircraft said to be Linke-Crawford's has the personal marking of an eagle with outstretched wings painted on the fuselage side.

It is more difficult to be certain who shot Linke-Crawford down, however. Mr. Bowyer says it was Major W. G. Barker, V.C., D.S.O., M.C., possibly on the authority of Drew's *Canada's Fighting Airmen*, in which the Austrian pilot appears as "Captain Linke." But Drew is so shaky in some of his statements that one hesitates to accept his story of Linke-Crawford's death without other confirmation. Such confirmation may well exist; if so, I shall be glad to learn of it, but one cannot overlook the fact that there are at least two other accounts of Linke-Crawford's death.

Although I do not have a copy of Norman Macmillan's *Into the Blue* available at present, I am fairly certain that he says therein that Lin[illegible]-Crawford was shot down by Capt. Cottle of No. 45 Sqn., R.A.F.

Cavigioli implies that the Austrian ace was shot down by an Italian pilot, for he says that Linke-Crawford "in 1918 commanded the 60th *Jagdkompagnie*, located at Feltre. He fell at noon on July 28, 1918, in combat with three Italian fighters above Valdobbiadene. He had 27 victories." We therefore have three possible conquerors of Linke-Crawford. Does anyone know positively who *did* shoot him down?

It is always rather unwise to dogmatize about pilots' victory scores. Cavigioli quotes (page 53) the official Austro-Hungarian list as part of his Italian translation of an article by Ladislaus Madaràsz that originally appeared during 1927 in the monthly review *Luftflotten*. Madaràsz was himself an ace. The list is:

Godwin Brumowsky 35, Frank Linke-Crawford 27, Benno Ritter von Fiala Fernbrugg 27, Julius Arigi 26, Josef Kiss 19, Stefan Fejes 18, Franz Gräser 15, Adolf Heyrovsky 12, Eugen Bönsch 11, Friedrich Navratil 10. Pilots with fewer than ten victories (precise totals not quoted were: Ludwig Hautzmayer, Josef Maier, Alexander Mahy, Franz Rudorfer, Johann Risztics, Kurt Gruber, Ladislaus Háry, Ernst Strohschneider, Karl Patzelt, Karl Kaszala, Georg Kentzian, Gustav Salmon, Ladislaus Madaràsz, Nàndor Udvardy, Alexander Hartzer, Vincenz Magut, Géza Csenkey . . . "etc.," concludes Cavigioli.

Although in that list Kurt Gruber's name appears among those with fewer than ten victories, Cavigioli later (page 56) credits him with ten.

Birmingham 32. J. M. BRUCE.

Africargo DC-6s

IN your issue of January 9, you reported that the purchase of two DC-6 aircraft for Clanair Ltd. has been financed partly by a loan from the Export-Import Bank.

Of the two aircraft referred to (which are operated by Hunting-Clan Air Transport on their Africargo service), only one is in fact registered in the name of Clanair Ltd. The other is in the name of Northern Aircraft Operating Co., a subsidiary of the Hunting Group. NIGEL SEYMER,

London, E.C.3. Public Relations Officer,
British and Commonwealth Shipping Co. Ltd.

In Brief . . .

ON page 99 of *Flight* for January 16, Roger Bacon ("Straight and Level") refers to the fact that Eagle Airways (Bermuda) stewardesses wear shorts. When the service started at the beginning of May last year, the stewardesses—five lovely and lively local lasses—did wear blue Bermuda shorts; but our chairman, Mr. Harold Bamberg, made a last-minute decision, and decided that the shorts should be replaced by the traditional skirts.

London, W.2. EAGLE AIRWAYS LTD.
C. G. Worrall, Publicity Manager.

FORTHCOMING EVENTS

Feb. 4. Kronfeld Club: "Air League of the British Empire," by A. Cdre. G. J. C. Paul.
Feb. 5. R.Ae.S.: First Halford Memorial Lecture, by J. L. P. Brodie (at Hatfield Branch).
Feb. 6. Helicopter Association: "Some Engineering Aspects of Helicopter Assessment Trials," by H. J. Webb.
Feb. 7. British Interplanetary Society: "High-energy Fuels and Rocket Propulsion," by Dr. F. Fitzgerald.
Feb. 11. Kronfeld Club: "The Tipsy," by C. Riddell.
Feb. 11. Society of Instrument Technology: "A Digital Instrumentation System in the Testing of Jet Engines," by L. Airey.
Feb. 12. R.Ae.S. Guided Flight Section: "Earth Satellites," by W. H. Stephens.
Feb. 13. R.Ae.S.: Presidential Reception.
Feb. 13. Plymouth Aero Club: Annual Dinner Dance.
Feb. 17. R.Ae.S.: "Engine Starting Systems," by R. H. Woodall.
Feb. 18. Aircraft Recognition Society: Talk by Peter Masefield.
Feb. 19. R.Ae.S. Guided Flight Section: "Theoretical Studies of Guided Missile Systems," by E. G. C. Burt.
Feb. 20. Avro 504 Club: Annual Reunion, Londonderry House.
Feb. 23-24. Canadian Aeronautical Institute: Special Anniversary Meeting, Queen Elizabeth, Montreal.
Feb. 24. R.Ae.S.: "Flight Development of Aircraft before and during Operation," by Dr. A. E. Russell, C. Abell and Dr. E. Warlow-Davies.
Feb. 25. Aerodrome Owners Association: a.g.m. and Annual Dinner.
Feb. 25. Kronfeld Club: "Some Medical Aspects of High-speed and High-altitude Flight," by Dr. R. Wombeek.

R.Ae.S. Branch Fixtures (to Feb. 6): Feb. 2, *Derby*, "Performance Problems in Large Rocket Engines," by S. L. Bragg; *Glasgow* (Graduates' and Students' Section), "Tropical Trials of the Scottish Aviation Twin Pioneer," by J. Chalmers and Capt. J. Blair; *Henlow*, presidential address. Feb. 3, *Boscombe Down*, "The Training of Soviet Engineers," by E. G. Sterland; *Luton* "Systems Simplified," by J. Wotton. Feb. 4, *Brough*, "Production of the P.1," by T. O. Williams; *Christchurch*, Lecture in conjunction with the British Association; *Gloucester*, "Supersonic Propulsion," by R. R. Jamison; *London Airport*, "Powerplants of the Future," by A. A. Lombard. Feb. 5, *Bristol*, "Bloodhound" (3rd lecture in guided-missiles series), by D. Farrar; *Isle of Wight*, "Vertical Take-off Aircraft," by Prof. E. J. Richards; *Swindon*, "Technical Education," by Prof. A. R. Collar.

Boarding B.O.A.C. Comet G-APDE at London Airport on January 20 for India and Pakistan is the Duke of Edinburgh. Seen leaving the aircraft are the Queen and other members of the Royal Family

AIR COMMERCE

C.P.A.L. ACROSS CANADA

THE arrival in Havana on December 17 of Cubana's first Pacific permission to operate a daily transcontinental service each way on the route Vancouver - Winnipeg - Toronto - Montreal. While falling well short of C.P.A.L.'s ambitions (in particular the airline hoped for a higher frequency and the inclusion of traffic rights in Alberta), this is at least a start. The Board recommend a review in two years' time.

Canadian Pacific's choice of equipment has not yet been clearly established. DC-6Bs are immediately available, and Britannias could be placed on the route. But something faster may be appropriate when T.C.A. place DC-8s on their non-stop transcontinental service next January.

SIGNS OF THE TIMES

PRIMARILY as a result of last year's poor traffic, two of West Germany's five leading independents (see *Flight*, November 14) have ceased operations.

In December Aerotour were liquidated, three of their Vikings having been seized at Hamburg, Stavanger and Basle. Their two DC-4s were sold to a newly formed operator, Continentale Deutsche Luftreederei. Shortly after this it was learned that the owner of Aerotour, Herr Helmut Krukenberg, had become associated with Transavia.

This second carrier has also now gone into liquidation and a creditors' meeting is due to take place on February 10. Its two DC-4s are rumoured to have already been sold, two Vikings are being held at Blackbushe (one of these having been abandoned, the aircrew claiming that their salary payments were in arrear) and the remaining three Vikings are being offered for sale on very reasonable terms—reportedly at about £12,500 per aircraft.

A new general manager, Herr Karl Herfurtner, was appointed shortly before Transavia's financial condition became publicly known. Herr Herfurtner had originally founded the company in 1956 but had relinquished control in the following year to Dr. H. Tigges, a well-known travel agent. Among the airline's creditors is Herr Carl Nolte who financed the purchase of Transavia's equipment.

CUBANA BRITANNIAS

THE arrival in Havana on December 17 of Cubana's first Britannia, carrying a team of 18 Bristol maintenance and service personnel, could perhaps have taken place at a more propitious time. Up-to-the-minute reports from the team, however, show that in spite of the political upheaval they were able to continue their various activities in conjunction with the airline without too much difficulty.

Shortly after the revolution broke out the Bristol men were interviewed at the military headquarters of the new regime and given formal clearance to carry on with their duties. Since January 1 there has only been one day (when a Check 1 was due) on which the Britannia did not fly passenger services.

During the first few days of January the Britannia made three return trips to Miami, carrying full loads in each direction. Six flights to Mexico City were also completed, again with capacity loads. On Sunday the 11th, with two other aircraft unserviceable, the Britannia was switched to Cubana's New York route and has since been making the return flight each day. In the week ended January 14 the aircraft logged over 50 hours in service.

The executive vice-president and general manager of Cubana, Senor Juan M. Palli (who has controlled the airline since it became wholly Cuban-owned two years ago), is reported to have expressed his thorough satisfaction with the performance of his company's first Britannia and to be looking forward to receiving the second aircraft shortly and the remaining two according to programme. Cubana's chief pilot, Bill Cook, is now in this country to collect the second Britannia, and delivery is imminent.

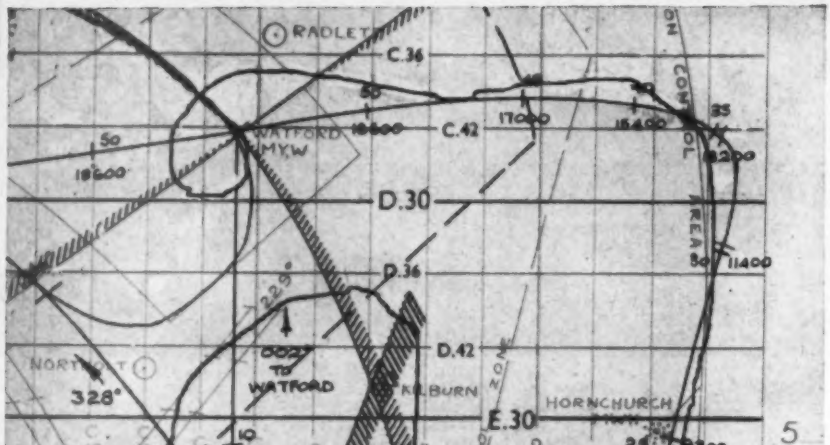
B.E.A. IN 1958

ONE airline is sure that better times lie ahead: the chairman of B.E.A. has recently expressed his "hope that the improvement from January to March will be sufficient to give us a small profit for 1958/59."

By the law of averages B.E.A. should in 1958 have carried for the first time in any twelvemonth as many as three million passengers, equivalent to 1,000 million passenger-miles. It now seems certain that these targets will be reached this year.

Traffic	Year ended December 31 1958	Year ended December 31 1957	Percentage Variation
Capacity ton-miles	176,764,000	156,229,000	+ 13.1
Load ton-miles	106,175,000	101,000,000	+ 5.1
Revenue load-factor	60.1%	64.6%	− 7.0
Passengers carried	2,760,000	2,752,000	+ 0.3
Passenger miles flown	961,242,000	926,010,000	+ 3.8
Passenger load-factor	62.3%	70.3%	− 11.4
Freight ton-miles	11,142,000	9,747,000	+ 14.3
Mail ton-miles	3,965,000	3,593 000	+ 10.4
Average staff numbers	11,485	10,848	+ 5.9
C.T.M. per employee	15,400	14,400	+ 6.9

The first of twelve Friendships for Trans-Australia Airlines flew at Schiphol on January 16—in distinctly un-Australian weather



The demonstration approach to L.A.P., via Watford high-level stack (top left) and the centre-lines of Runways 28L, 23R and 23L. Heights and distances are marked along the let-down track. At 15-20 miles from 28L the Flight Log was referenced and the pen moved by itself to the corner of the zone. A positioning error of only about 1mm can be noted

COMET DEMONSTRATES DECCA

BY the time these words appear the M.o.S. Comet 2E G-AMXD fitted with several Decca receivers will almost have completed its important series of demonstrations to world airline and civil aviation authorities. Last week *Flight* took part in one of the series of three-hour flights, piloted by Lt-Cdr. "Doc" Stewart, from London Airport to the west coast of Ireland and back via a fictitious holding pattern and dummy approach to Exeter airport. Each flight was preceded by a thorough briefing on Decca Mk 10 operation and the aims of the M.T.C.A. in supporting its introduction as an additional international standard. (These aims were recorded in some detail on pages 121-122 of *Flight* last week.)

Of particular interest during the briefing for the demonstration in which we participated was the news of further Decca developments and the display of various sizes of Flight Log and miniature receiver equipment. The S.B.A.C.-racking version of Decca Mk 10 is now in production and a 1½ ATR version will shortly follow it. Later, a transistorized receiver taking half of this volume will permit duplicate installations within the 1½ ATR framework.

Flight testing of the H.F. digital data link equipment for automatic position reporting by aircraft has begun. Single-sideband will be employed, possibly sharing a speech channel. Identification of aircraft, or the triggering from the ground of a position report from a particular aircraft, will be achieved with conventional Selcal techniques, details of height, position and speed being transmitted and either printed directly on flight-progress strips or converted into a pictorial display. Both V.H.F. and U.H.F. data links could later be provided for short-range use.

One of the points particularly stressed during the briefing was that the twin-track airway dimensions proposed for Decca were based on evaluation of operational performance rather than on theoretical values. All Decca errors and the ability of the average pilot were amply allowed for in defining the two four-mile-wide lanes separated by a three-mile buffer zone for both high- and low-altitude airways.

During the flight the Mk 10 receiver functioned faultlessly despite some thunder and lightning in the London area. A single receiving aerial, mounted under the starboard wing, served a Mk 7, two Mk 10s and a Dectra receiver. Seven discharge wicks were attached to the trailing edge of each aileron, and others were fitted to the elevators. Dectra was demonstrated only over the western Atlantic area.

Flight Log charts had been prepared to cover the route of the demonstration flight, the fictitious holding pattern near Exeter being an easily added feature requiring no equipment on the ground. As will be seen from the actual-size portion of the Decca chart reproduced above, the Comet returned to London Airport following the marked approach track to Runway 28 left, but turned off to land on 23 left, which was at the time the runway in use. The approach was initially made to 23 right, but a rapid side-step took us over to the other centre-line for the landing. During the let-down from the Watford area, a very strong wind carried the aircraft wide on the turns, but this effect was immediately noticeable.

Operation of the receiver appeared to be extremely simple. Initially, all the switches on the control panel were turned on and the Flight Log pen was set down at one corner of the zone covering the take-off point. When the take-off was begun, the selector was set to the operating position and the pen immediately moved over to the actual position and began tracking. The three Decometers positively indicated every 20 sec whether they were positively set. In case of doubt, the selector could be turned to "reference" and the pen immediately moved itself over to the nearest zone intersection. Any Flight Log error was shown by a displacement from the exact point of intersection. At no time during frequent referencing for demonstration purposes was the pen more than a millimetre or so out. When the selector was returned to the operating setting, the pen quickly caught up with the aircraft position and continued tracking. The whole operation took about 10 sec.

Chart changes were also very simple, taking about 30 sec. The procedure was to set the chart selector to the new chart when the pen reached a marked point on the map. The pen was driven along a dotted line to the nearest zone intersection on the new chart and then moved itself to the new location and continued tracking as soon as the selector was operated. When changing chart or chain, or when the Flight Log was being checked, there seemed to be practically nothing to do and accurate working was immediately apparent. From the pilot's point of view this represents a very considerable advance over the earlier receivers, in which the pen had to be placed on the exact point on the chart before accurate tracking could start.

Any required information can be marked on the charts, so that holding patterns, overtaking patterns and flight information of a more general nature may be incorporated as required by any particular operator. The form of the Flight Log can also be varied, a particular example being the plastic chart and cursor system used by Silver City. For their 20-minute cross-Channel flights it is obviously impractical to use up and throw away a small chart after every crossing. The normal charts may, of course, be retained as a permanent record of the track flown, though this with some pilots, might prove unpopular.

In the course of the demonstrations the M.T.C.A. has put up a most convincing case for Decca Mk 10, both theoretically and in practice. A combination of Mk 10 and its data link appears to offer both pilot and controller a happier prospect than Vortac-supported surveillance radar, but it remains to be seen whether self-evident technical merit will be able to prevail in the international arena at Montreal.

AIR COMMERCE . . .

DOG EAT DOG?

HAWAII is a small place to boast two competing airlines. When the traffic density on the inter-island services is taken into account there seems little room for two competitors to spread their wings. And when the volume of traffic falters, as it did last year, the pressure starts to bear on the weaker of the two.

In the case of Hawaii it is difficult to foresee which carrier is least likely to succumb. Both admit the financial difficulties that result from such severe competition in a strictly limited market, both are subsidized by the C.A.B. through mail payments, and each expresses a willingness to take over the other.

Hawaiian Airlines are the older and larger of the two. Founded thirty years ago this month, they had a twenty-year monopoly of scheduled services until Trans-Pacific entered the field in 1949. To meet this new challenge Hawaiian purchased five Convair 340s in 1953. The acquisition bolstered Hawaiian's share of the market, which had sunk to about two-thirds, to some three-quarters of the total, and this share has since remained more or less unchanged. In addition to the Convair fleet, Hawaiian

operate eight DC-3s and a DC-6C (which concentrates on long-haul charter flights).

Trans-Pacific, who recently changed their name to Aloha (the vernacular for "welcome"), started non-scheduled services immediately after the war, and were granted scheduled rights three years later. Their fleet now numbers seven DC-3s, and a firm order stands for three Fairchild F-27s, together with an option on a further two. Delivery of these aircraft is expected later this spring. Fitted as 44-seaters, the F-27s are likely to strengthen their operator's competitive position: flight time on the main route from Honolulu in the north-west to Hilo in the extreme south-east will be only 56 min as compared to 95 min for the DC-3.

Hawaiian have responded to Aloha's move by deciding to install turboprop engines in their Convairs (either Allison D501s or Elands). But although this re-equipment will guarantee an improvement of service to the customer, there is little prospect of financial advantage to either operator unless traffic expands more rapidly than capacity. Both carriers promote their services with unbridled zeal—Hawaiian's 28-minute travel film, *Our Islands of Hawaii*, won first place in the section on promotion films at last summer's International Film Festival at Milan—and they endeavour to lure the public into the air by such devices as the installation of panoramic windows in DC-3s. But economic self-sufficiency will only come when less expensive means of expanding the market are found. One such course would be development of the tourist trade at resorts other than Waikiki.

IRISH PILGRIMS

WHILE most airlines last year were struggling to maintain their traffic at the previous year's level, Irish Air Lines were going from strength to strength. One factor behind this growth was the initiation of transatlantic services by Aerlinte Eireann. A less obvious factor was the steady development of pilgrim traffic as the airline's European network has expanded.

Over the whole financial year 1958-59 the airline expects to carry at least 50,000 pilgrims on Aer Lingus services between Dublin, Lourdes, Rome and Barcelona, many of these having come across the Atlantic by Aerlinte. Most of this traffic moves in the summer months, and rather more than half makes use of charter flights. In the period April-October 25,000 pilgrims travelled on such services between Dublin and Lourdes, while a further 2,600 travelled from points outside Ireland. Dublin-Lourdes was also the most popular scheduled route, but a further 8,500 pilgrims were carried to Lourdes from Barcelona and Rome —5,000 and 3,500 from each respectively.

Aer Lingus expects that this year will see a further expansion in pilgrim traffic. The airline is due soon to open a service to Lisbon, and this should be well patronized by visitors to the shrine at Fatima. As this service will be routed via Lourdes, a considerable volume of traffic should develop between the two shrines.

Another pilgrimage will take place this year to Trier, on the Moselle. From July 19 to September 20 the Holy Mantle will be exhibited for public veneration. This event takes place only twice in every century: upon the last occasion, in 1933, over two million pilgrims visited Trier. Aer Lingus plan to carry a large number of this year's pilgrims on their regular services to Brussels, Dusseldorf and Frankfurt in addition to charter flights.

MARCONI ORDER

A NUMBER of Marconi AD.210C automatic V.H.F. direction finders have been ordered for installation at Southern, Northern and Scottish A.T.C.C.s and at Gatwick, Stansted, Blackbushe and Elmdon. The AD.210C is simpler and cheaper than earlier versions but offers the same accuracy. Aerial and receiver may be remoted six miles from the master indicator and one of five preset frequencies between 100 and 156 Mc/s may be selected by push-button.

EXIMBANK REPORT

THE latest annual report of the Export Import Bank of Washington, for the fiscal year ended July 30, 1958, provides outsiders with a valuable cross-check on the extent to which U.S. manufacturers are assisted in their efforts to sell abroad. The report makes no bones about the bank's basic function: to negotiate loans "in support of United States overseas trade."

EXPORT-IMPORT AIRLINER CREDITS

Country	Year negotiated	Purchase	Amount ($m)	Rate (%)
Africa				
Ethiopia ...	1955	Aviation facilities* ...	24.7	5
Asia				
Indonesia ...	1950	Aircraft, various† ...	6.0	3½
" ...	1956	" " ...	7.5	—
" ...	1957	" " ...	1.8	5½
Japan	1956	4 DC-7C (JAL)	7.7	—
"	1956	4 DC-8 (JAL)	16.5	—
Pakistan ...	1957	2 L.1049G (PIA) ...	2.8	—
"	1957	Curtiss Wright Engines	0.5	—
Europe				
Germany ...	1955	Bell 47s	0.1	—
Italy	1952	Aircraft various (IRI) ...	3.5	3½
"	1955	4 DC-7C (Alitalia) ...	4.7	5
"	1958	4 DC-8 (Alitalia) ...	13.7	—
Portugal ...	1954	3 L.1049G (TAP) ...	1.9	5
France... ...	1957	17 B.707 (AF)	46.0	5½
U.K.	1958	1 DC-6A (Clanair) ...	1.0	—
Latin America				
Brazil	1953	3 L.1049G (Varig) ...	3.1	4½
"	1954	4 CV.340 (Cruzeiro) ...	1.9	4½
"	1956	2 L.1049G (Varig) ...	4.0	—
"	1956	4 DC-7C (PAB) ...	6.9	—
"	1957	4 DC-6B (Loide) ...	4.3	—
"	1957	4 CV.440 (Cruzeiro) ...	2.1	—
Costa Rica ...	1954	2 CV.340/440 (LACSA)	0.7	5
Venezuela ...	1957	5 F-27 (Avensa)... ...	1.1	—

* Includes 3 DC-6Bs for EAL.

† Includes 8 CV.240, 8 CV.340 and 2 CV.440 for Garuda (plus possibly 3 Electras).

The policy of the Eximbank in granting aircraft credits has already been described in *Flight* (p. 928, December 12). Publication of the latest report allows an up-to-date picture to be drawn of the bank's activity, for its aircraft credits can easily be extracted: they are listed in the accompanying table. (The two 1958 items were concluded after the close of the bank's financial year.)

Two facts stand out clearly in this tabulation: the annual volume of aircraft credit has been falling since 1957; and the total value of these credits amounts to $142m, of which 50 per cent represents sales to European carriers. Prior to 1956 the cumulative value of ExIm aircraft credits had reached only $25m. Then, with the dawn of the jet-buying age, the volume of new credit increased sharply: by $43m in 1956 and by $59m in 1957. But the market was saturated by 1958 and the only two reported credits amounted to $15m ($14m for Alitalia's four DC-8s and $1m for Clanair's DC-6A).

The $46m credit for 17 Air France Boeing 707s stands out as the bank's largest single transaction and represents one-third of the value of total airliner business. Other prominent transactions were those for J.A.L.'s four DC-8s ($16.5m) and for Alitalia's four DC-8s ($13.7m). Of the $24.7m credit to Ethiopia only some $3m was on account of aircraft, the balance having been earmarked for the improvement of the country's airport and airways system.

The latest report does not quote interest rates for every transaction. The bank's policy is to keep in line with prevailing U.S. rates, and the figures that have been published suggest that this policy has been adhered to in practice. If anything, the bank is reputed to be tight-fisted rather than generous in these matters. The repayment period covers a maximum of five years in the case of piston equipment, and seven years for turbine aircraft.

THE QUEBEC DISASTER

CANADA'S House of Commons has received an alarming report on the circumstances of the accident to a chartered DC-4 in August 1957, which involved the death of 79 persons. The board of inquiry stated that the pilot, Capt. T. N. D. Ramsay, committed "a grave error of judgment" in electing to overfly Quebec City when his fuel position was becoming critical.

The aircraft, belonging to Maritime Central Airways, had been chartered by a group of ex-servicemen and their families for a flight from London to Toronto. During this flight, said the findings, four breaches of regulations took place: the aircraft was overloaded by about 1,840 lb on take-off from London and Keflavik; it was overloaded on landing at Keflavik; the pilot requested and received a flight plan that stipulated a smaller fuel reserve upon arrival at Montreal than was required by the regulations; and the airline had failed to observe the regulations concerning flight dispatchers as given in the operations manual.

[*Continued overleaf*

Clanair's first Britannia, bearing the livery of the parent company, British and Commonwealth Shipping, has already operated a number of charter flights to the Far East

AIR COMMERCE . . .

The report noted that "elementary prudence and safe navigation" would have indicated the necessity of refuelling at Quebec City. Instead, the captain decided to proceed non-stop to Montreal. Only 15 miles west of Quebec City the DC-4 entered an area of severe turbulence, after which the captain apparently lost control of his aircraft. The investigators added this comment: "Being low on fuel and having no weather reports showing the possibility of cumulo-nimbus cloud build-up in the area, the pilot might—in order to save fuel—have elected not to circumnavigate the storm area." Lightning, icing, sabotage or navigational error were discounted as possible causes of the disaster.

In their final recommendations the board, having observed that the crew had been on duty for 22 hours by the time of the accident, suggested that the Department of Transport should set maximum limits to crew utilization instead of leaving it to the discretion of individual carriers.

Mr. C. F. Skinner (right), New Zealand's Deputy Prime Minister, being shown over the Dart Herald by Sir Frederick Handley Page

BREVITIES

Unofficial reports from South America suggest that Aerolineas Argentinas and Real Aerovias have received I.A.T.A. permission to offer reduced fares on certain services to meet competition from non-I.A.T.A. carriers.

* * *

Aerolineas Argentinas are reported to have ordered ten Fairchild F-27s for delivery this year.

* * *

The £10 fare for emigrants flying from Britain to Australia will now also apply on services via North America.

* * *

Chesterfield Corporation are reported to have bought two local farms, totalling 160 acres, for development as a helicopter station.

* * *

Two British travel agents—Horizon Holidays and Sir Henry Lunn's—are offering a 15-day inclusive tour of Russia using Aeroflot Tu-104s.

* * *

Eagle Airways' application to operate regular services between Jamaica, Nassau and Bermuda has been turned down by Jamaica's licensing authority.

* * *

As from January 30, National will increase the frequency of their Boeing 707 service between New York and Miami to three daily on Fridays, Saturdays and Sundays.

* * *

A strong sales team from Vickers-Armstrongs (Aircraft) Ltd., led by the company's managing director, Sir George Edwards, was due to start a tour of North America this week.

* * *

Mr. A. M. A. Majendie, M.A., A.F.R.Ae.S., F.I.N., has been appointed to the Air Safety Board. Mr. Majendie is at present a director of Smith's Aircraft Instruments Ltd.

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B.O.A.C. have applied to the A.T.A.C. for permission to include Wake and Tokyo as traffic stops on their proposed westward extension across the Pacific to Hong Kong and Singapore.

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Reports that Air India, Qantas and K.L.M. were planning to re-route their Europe-Australia services through Labuan (North Borneo) have been denied by each of these carriers.

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American Airlines inaugurated their Boeing 707 services as scheduled on January 25. The first flight, carrying 112 passengers from Los Angeles to New York, took 4 hr 10 min.

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An Australian Civil Aviation mission will visit the Hague in July to discuss the development of services between the Netherlands and Australia. At present K.L.M. fly once a week to Sydney.

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K.L.M. are planning to introduce a round-world service early this year. The round trip will take 80 hours: 32 hours on the polar service to Tokyo and 48 hours on the route to Japan through south-east Asia.

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Seaboard and Western increased their transatlantic freight traffic last year to 13.3m ton-miles (11.0m in 1957 and 9.4m in 1956). Mail was also carried for the first time last year and amounted to a further 1.7m ton-miles.

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The C.A.B. have decided to approve American Airlines' surcharge on first class fares on their Boeing 707 services. The Board also voted to suspend the scheme for coach-class surcharges pending further investigation.

The first Canadair 540, bearing the colours of Air Transport Command, R.C.A.F., was rolled out of the company's Montreal plant on January 19. A second aircraft will follow within a few weeks.

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Turkish Airlines are planning to inaugurate Viscount services between London and Istanbul this spring.

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An Italian aviation team is expected to arrive shortly in Ceylon to discuss the negotiation of a bilateral air agreement between the two countries.

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The opening of the new international airport at Port Moresby will permit Qantas to start operating services between Sydney and South-East Asia (Manila and Hong Kong) via New Guinea.

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Lufthansa plan to include Manchester in their North Atlantic network within the next few months. Runway limitations led D.L.H. to withdraw from Manchester in 1956.

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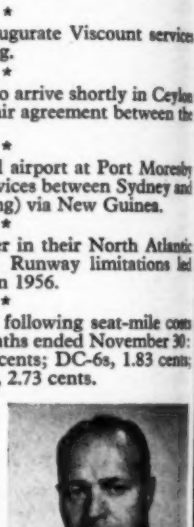
Continental Airlines have quoted the following seat-mile costs for their various aircraft over the six months ended November 30: Viscount 810s, 1.40 cents; DC-7s, 1.66 cents; DC-6s, 1.83 cents; Convair 340/440, 1.95 cents; and DC-3, 2.73 cents.



American Airlines have appointed Mr. Harry Dalgaard as their regional sales director for Europe, Africa and the Near- and Middle-East. He will be based at their London office in New Bond Street

Sudan Airways have ordered a Viscount 810. Delivery is due to take place in May.

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An Air Jordan airliner crashed near Amman on January 22. Nine fatalities were reported.

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Alitalia's summer schedule includes non-stop Viscount flights between London and Rome.

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Nigerian Airways dismissed 400 junior employees on January 17, following a strike over a claim for a 15 per cent pay increase.

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An American source reports that two Tu-104s have crashed as a result of control failure.

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Southeast Airline, an intra-state operator within Tennessee, has bought two ex-American Airlines Convair 240s from Ayer Associates.

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A new company, Linee Aeree Sicilian, has been established in Catania to operate helicopter services between the cities and resorts of the island.

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K.L.M. have been granted a permit by Russia to increase the number of services between Amsterdam and Moscow from one to two per week. The second service will operate from April 1.

SERVICE AVIATION

Royal Air Forces and Naval Flying News

Naval Appointments

SUCCEEDING Vice-Admiral Sir Manley L. Power next month as Deputy Chief of Naval Staff and Fifth Sea Lord, Vice-Admiral L. G. Durlacher has from August 1957 until last month been Flag Officer Commanding 5th Cruiser Squadron and Second-in-Command, Far East Station.

During the war, when Fleet Signals Officer on the staff of the C-in-C. Mediterranean, he was mentioned in despatches and appointed O.B.E. for distinguished services during the invasion of North Africa; then in March 1944 he took command of the destroyer *Volage*, and for his part in her action against shore batteries on the Andaman Islands in the Indian Ocean and against enemy submarine chasers and merchantmen was awarded the D.S.C. He is also a C.B.

It is also announced (as we go to press) that Admiral Sir Alexander Bingley, who was recently succeeded as Flag Officer Aircraft Carriers by Rear Admiral C. L. G. Evans, is to be C-in-C. Mediterranean from February 2 in succession to Admiral Sir Charles E. Lambe.

Seeing for Themselves

MAKING her first visit to the Middle and Far East since she became Matron-in-Chief of the Princess Mary's R.A.F. Nursing Service, Air Commandant Dame Alice Mary Williamson left Lyneham on January 21 in a Comet 2 of Transport Command's casualty evacuation service. She was accompanied as far as Singapore by the Matron-in-Chief and Director of Army Nursing Services, Brigadier Dame Monica Johnson, both matrons-in-chief wishing to have first-hand experience of arrangements for patients brought to the U.K. by Comet.

During her tour, planned to last about six weeks, Air Commandant Williamson is to visit R.A.F. medical establishments in Singapore, Hong Kong, Ceylon, Bahrain and Aden. She also hopes to go to El Adem, Malta and Cyprus.

Premier F.A.A. Award

FOR the part played by their Whirlwinds in the successful salvage of the Liberian tanker *Melika* in the Gulf of Oman last September, and for their "embarked operations in circumstances of outstanding difficulty," No. 845 Sqn. has been awarded the Boyd Trophy for 1958. This is the premier trophy of the Fleet Air Arm, awarded annually for the finest feat of aviation during the year in the Royal Navy.

At the time of the *Melika* operation the squadron (commanded temporarily by Lt-Cdr. C. M. A. Wheatley, R.A.N., the Senior Pilot) was embarked in H.M.S. *Bulwark*, and among its tasks were flights to take medical officers to other tankers which had picked up injured survivors. Some of these men were flown back to the carrier for treatment and nine of the most seriously injured were then taken to R.A.F. Masira, the three Whirlwinds carrying out this task all having to make night landings. One of the spuadron aircraft also helped to secure a fresh tow to *Melika* (when it parted owing to her violent yawing) by passing the first line.

The other operations for which the Boyd Trophy has been awarded—undertaken in "circumstances of outstanding difficulty"—were carried out over the Aden Protectorate, where the Whirlwinds had to fly over mountainous terrain at heights of up to 8,000ft in a temperature of over 100 deg F.

No. 845 Sqn., which returned to the U.K. in *Bulwark* last October, is now commanded by Lt-Cdr. A. G. Cornabe and recently embarked in *Centaur*.

This new portrait of the Queen, and a companion picture of the Duke of Edinburgh, were unveiled in the officers' mess at the R.A.F. Technical College, Henlow, last week by the Air Member for Supply and Organization, Air Chief Marshal Sir Walter Dawson, seen here with the A.O.C. and Commandant, A. Cdre. T. U. C. Shirley (right). The paintings were commissioned by officers of the College and are the work of Edward I. Halliday, who is the president of the Society of British Portrait Painters

Air Marshal Durston

WE regret to record that Air Marshal Sir Albert Durston, K.B.E., C.B., A.F.C., who was Deputy Chief of the Air Staff from September 1945 to June 1946, died last Saturday at the age of 64.

His career (which began as a midshipman in the R.N.R. in 1913) was marked by an emphasis on R.A.F.-R.N. co-operation. Thus in 1927 he went to the School of Naval Co-operation as an instructor, subsequently becoming its commander; and in 1936 he was appointed fleet aviation officer to the C-in-C. Home Fleet.

When first appointed to the Air Ministry (towards the end of 1938) he was made Deputy Director of Operations (Naval Co-operation); then in 1942 he became A.O.C. No. 18 Group, Coastal Command. A year later he went to the Command's headquarters as S.A.S.O., and in 1944 to S.E. Asia to command No. 222 Group.

Air Marshal Durston was created K.B.E. in the year of his retirement (1946), having been made a C.B. in 1942. His A.F.C. was awarded in 1919 and during the First World War he was twice mentioned in dispatches.

More Butterworth Sabres

A SECOND R.A.A.F. Avon - Sabre squadron, No. 77, is to be operational at Butterworth in Malaya by the end of next month. This was stated last week by A. Cdre. K. R. J. Parsons, O.C. Butterworth, following a visit there by the C.A.S., Marshal of the R.A.F. Sir Dermot Boyle, during his tour of overseas units.

A Year's Grace

THERE was a happy ending last week (at least for the time being) to the Malcolm Clubs controversy, when it was announced in the House of Lords that the

A trial underwater ejection by a Naval medical officer in the test tank at Glen Fruin. Note the attendant frogman. (See news-item in Col 1)

Air Minister had decided not to take any steps as a preliminary to closing them for at least twelve months.

Marshal of the R.A.F. Lord Tedder, opening a debate on the subject, had said that what the clubs lacked—far more than working capital—was goodwill from the Minister and his advisers. Given that goodwill, he was sure that the capital would be forthcoming. The Clubs had a substantial surplus of assets over liabilities; they were solvent and month by month were paying off their debt. Only organizations like the Malcolm Clubs, the Y.M.C.A., Church Army and Salvation Army "could provide vital human service." Because of that, it was deplorable that there should be support for pressure to ensure a monopoly for Naafi.

Peers on both sides of the House supported Lord Tedder and welcomed the news given by the Earl of Dundee, Minister without Portfolio, when he said that no notices would be given to the Clubs this year. In the meantime, the subsidy necessary to meet their cash losses would continue to be paid.

Getting Out from Under

TRIALS of underwater ejection from Naval aircraft described in *Flight* for August 8 last year were the subject of an Admiralty announcement last week. A training film on the subject—made for the Ministry of Supply—was shown, and it was stated that pilot ejection from submerged aircraft was now "a fairly safe procedure" in all current Naval aircraft fitted with ejection seats.

As outlined in last year's *Flight* article, the trials were carried out by Naval medical officers from the R.A.F. Institute of Aviation Medicine, Farnborough, mainly at the Admiralty Hydro-ballistics Research Establishment at Glen Fruin, Dumbarton. A standard Martin-Baker Mk 2D seat was used in the deep tank at Glen Fruin, and the initial difficulty of firing the seat gun under water—leakage into the gun barrel forming a hydraulic lock with the piston—was overcome by the simple modification of drilling holes in the firing head so that the water could drain away.

The main physical problems of underwater escape are (1) the acceleration of the body through the water, (2) drag of water on the body, (3) blast pressure from the explosion of the ejector-seat charge and (4) possibility of lung damage from the change in pressure with depth. Tests with dummies were followed by live ejections, using 60ft/sec and 80ft/sec seat guns, the latter giving a drag force equivalent to that of a Mach 1 ejection at 35,000ft. Maximum peak accelerations did not exceed 9g and mean acceleration was less than 6g—these forces being within the tolerance limit accepted for normal ejections in the air.

In many cases when an aircraft is submerged it is difficult to jettison the canopy before ejection because of the weight of water and absence of airflow, and dummy tests were made of ejections through the canopy. It may be recalled that such an ejection, from a submerged Wyvern, was successfully made by Lt. Bruce McFarlane, R.N., in October 1954.

The film of the Glen Fruin tests is to be shown to Naval and R.A.F. aircrew and additional test-tank facilities are to be provided near Fareham, Hants, to provide practical training for Naval pilots.

Artistic Incentive

A PAINTING and sketching competition open to members of the R.A.F., W.R.A.F. and Princess Mary's R.A.F. Nursing Service throughout the world, and to aircraft apprentices and boy entrants, is to be held in June. The event is the first of its kind and scope ever organized by the R.A.F. Judging will be by a committee of eminent representatives of the art world, and prizes are being provided by the R.A.F. Central Fund.

Entries must have as their subject some aspect of life in the R.A.F., and must be original compositions and the work solely of the competitor; they may be in oils, water-colour, pastel, black-and-white, pen and wash, drawing and sketching; they should be suitably mounted and framed and not smaller than 18in by 12in, including the mount. Entries must reach the Air Ministry (E.S.4c), Adastral House, Theobald's Road, London, W.C.1, by May 31.

R.A.F. Postings

AMONG appointments recently announced by Air Ministry are the following:—

Group Captain H. E. C. Boxer to the Imperial Defence College for studies.

Wing Commanders C. K. Street to Air Ministry, for duty in the Department of the C.A.S. (with acting rank of group captain); P. J. Anson to R.A.F. Chivenor as Chief Instructor and O.C. the Flying Wing; P. R. ap Ellis to R.A.F. Hawarden as Regional Recruiting Officer; E. P. Appleton to the R.A.F. Records Office, to command "A" Division; E. J. Brooks to R.A.F. Wethersfield as O.C. and R.A.F. Liaison Officer; J. McD. Craig to the R.A.F. Flying College, Manby, as O.C. operational studies; P. G. D. Farr to the Joint Services Staff College, for Directing Staff duties; P. W. Helmore to A.H.Q., Malta, for air staff duties; L. C. Inglefield to the R.A.F. Regiment Depot, Catterick, as Chief Instructor; R. R. Jack to H.Q., R.A.F. Germany (2nd T.A.F.), for administrative staff duties; A. J. Moody to R.A.F. Germany (2nd T.A.F.) for duty in the C-in-C.'s Secretariat; T. F. Neil, as secretary, British Joint Services Mission, Washington; T. C. Pinkerton to R.A.F. Hemswell, to command the Technical Wing; G. F. Rogers to No. 1 School of Technical Training, Halton, for accounts duties; A. Shaw to Air Ministry, for duty in the Department of the C.A.S.; R. J. V. Smyth to the Australian Ministry of Supply, Melbourne; A. B. Thomson to Air Ministry, for duty in the Department of the Air Member for Supply and Organization.

Gen. Mohammad Ayub Khan, President of Pakistan, presenting the Atcherley Flying Trophy—awarded to the best pilot on the course at the Pakistan Air Force College, Risalpur—to Flt. Cdt. U/off. Razfaq

38 Group Reunion

ON Saturday, March 7, the 38 Group Old Comrades Association is holding its 13th annual general meeting and reunion dinner. This will be at the Victoria Hotel, Buckingham Palace Road, London, S.W.1, at 7 p.m. Tickets (£1 each) may be obtained from the secretary, Mrs. L. C. Rendall, Hotel Metropole, Brighton, Sussex.

IN BRIEF

Queen Elizabeth the Queen Mother, as Commandant-in-Chief of the W.R.A.F., is to attend a reception at St. James's Palace on March 19 to celebrate the tenth anniversary of the integration of Princess Mary's R.A.F. Nursing Service and the Women's Royal Air Force into the R.A.F.

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The National Small-bore Rifle Association announced last week that R.A.F. Halton had during 1958—for the third year in succession—gained the highest Services standard of efficiency.

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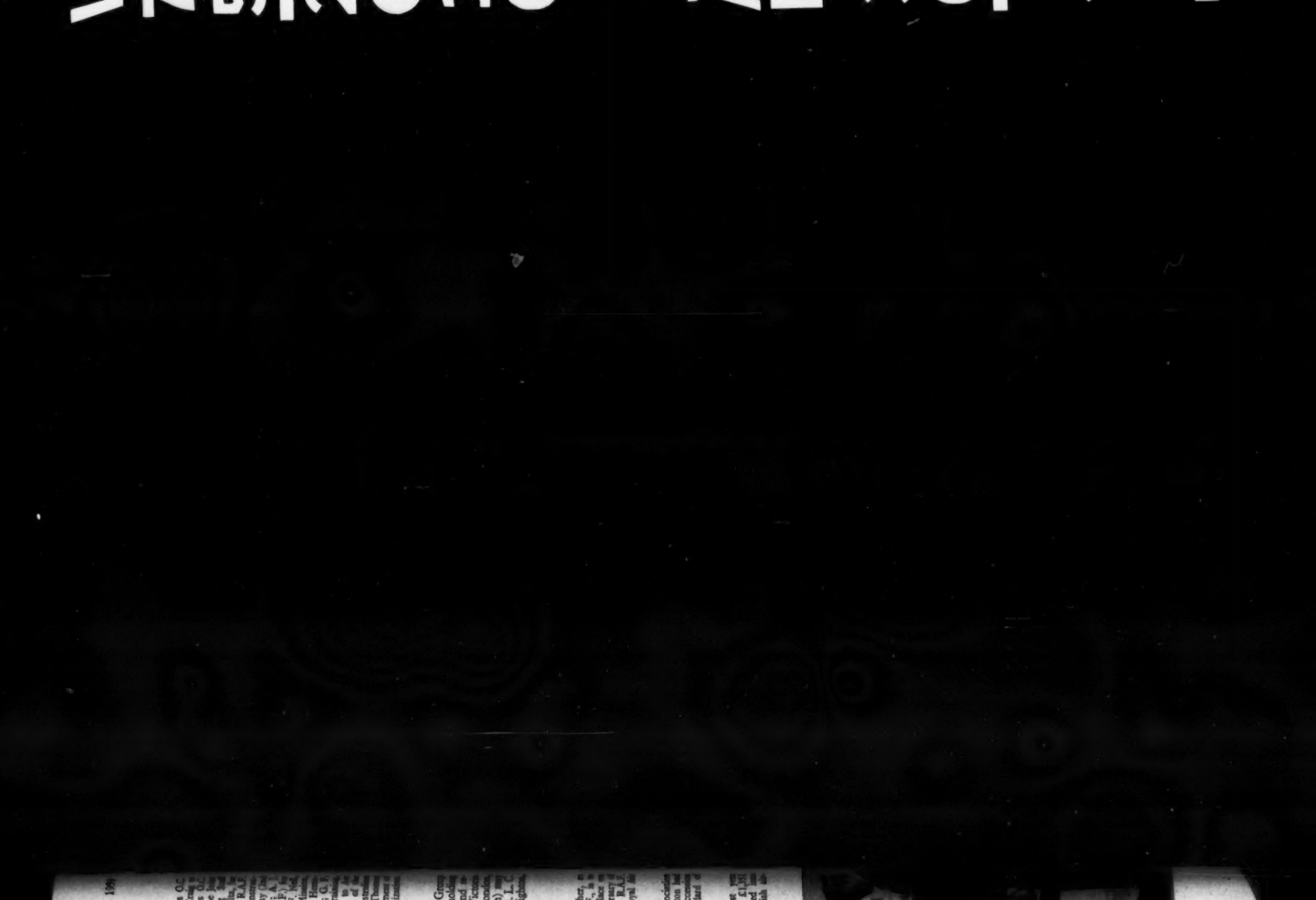
The R.A.F. Benevolent Fund last year benefited by £1,929—compared with £1,351 in 1957—from foreign coins dropped into collecting-boxes by travellers at British airports and seaports.